

PATEK PHILIPPE'S NEW CHRONO CALIBER

WatchTime

THE MAGAZINE OF FINE WATCHES

TESTS & REVIEWS

**TAG Heuer Grand
Carrera Calibre 36 RS
Caliper Chrono
Mühle Glashütte
Germanika I
Movado SE Extreme**

WATCH ARTISAN

Zurich's Paul Gerber

SHARK TALE

**The Hunt for the
Jaws Divers' Watch**



TEST: **LANGE**
ZEITWERK

February 2010

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www.watchtime.com



Another Mystery Solved

Regular readers know that we've been having some fun lately focusing on (and sometimes solving!) some long-standing watch mysteries. We reported in detail on who stole, how he stole, and how Israeli police recovered the long-missing Breguet Marie Antoinette watch (October 2008 and February 2009 issues). Ian Fleming expert Dell Deaton (February 2009) identified the specific Rolex watch that was the inspiration for the Rolex that James Bond wears in the

Fleming novels. In the last issue, Gisbert Brunner determined who won the Great Automatic Chronograph Race of 1969 (Seiko). Well, the sleuthing goes on. For 25 years watch buffs have wondered what watch Richard Dreyfuss wore in the 1975 blockbuster movie, *Jaws*. In "Capturing the *Jaws* Watch," (page 68), Gary and Christian Stock, brothers steeped in both watch and film lore, tackle "the best-known unknown timepiece in history," as they put it, and solve the mystery

of Matt Hooper's watch.

You'll find another piece of super sleuthing, albeit of a different sort, in "Deconstructing Seiko." In it, senior editor Norma Buchanan solves the riddle of the ultra-complicated, ever evolving structure of the Seiko Group. We often report on the Swiss watch groups Swatch and Richemont. Seiko, however, we almost always cover as a watch brand. It is that, of course, but Seiko is also a giant, highly diversified group with total sales of around \$16 billion. Buchanan's not-so-simple assignment while visiting Seiko in Japan last fall was to come up with a simple explanation of the complex group. Her report begins on page 44.

A few issues ago (August 2009), we reported on A. Lange & Söhne's new and unusual Zeitwerk watch, which the company considers its most important product launch since the Lange 1. The watch is a rarity: a high-mechanical watch with a digital display for the hours and minutes. In our original story, we detailed the technical innovations in the piece: the jumping numeral mechanism, the dual-function constant-force escapement, and the main-spring barrel bearing system. Truth be told, we wondered how well this complex watch, whose disks move 1,416 times per day, would work. Perhaps you did, too. Well, we have the answer in our test of the Zeitwerk, this issue's cover story beginning on page 82.

Patek Philippe provided more than its share of surprises in 2009 (launching its own Seal and the retirement of long-time CEO Philippe Stern). In October, Patek unveiled its new, in-house manual-wind movement and — surprise! — it's in a ladies' watch. Senior editor Buchanan was with Patek in Paris for the launch. Read all about it in the article "Ladies' Turn," beginning on page 90.

Finally, I must call your attention to two tidbits in this issue. One comes in Richard Carlton Hacker's Fine Spirits column. There a Panerai-crazy sommelier reveals the perils of wearing his favorite watch on the job. (Hint: it involves Bordeaux glasses.) The other comes in the Readers' Forum section, where a warm-hearted reader, Eric Stein, expresses concern about the health of three of our columnists. He worries about Hacker because, as Stein memorably puts it, "Mr. Hacker drinks alcohol for a living." I answer Mr. Stein in the Readers' Forum, but I didn't have the heart to tell him that Hacker also writes about firearms.

Happy New Year!

Joe Thompson
Editor-in-Chief



What's that on
Dreyfuss's wrist?

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WatchTime

THE MAGAZINE OF FINE WATCHES

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Test typos



A stump fit for a queen

“I PURCHASED THE ORIGINAL OMEGA MOON WATCH IN 1972 FOR \$120. THAT WAS A LOT OF MONEY BACK THEN FOR SOMEONE IN THE ARMY, BUT IT WAS A BEAUTIFUL WATCH.”

OMEGA MAN

I read with great interest about Omega’s new 40th-anniversary Apollo watch. I never knew what NASA did to have this watch in the space program. I own this original watch. I purchased it while I was in the Army in 1972 for \$120. That was a lot of money back then for someone in the service, but it was a beautiful watch. Mine has the black face with no flank guards. It is a Speedmaster Professional Mark II. I have only had to have it repaired once. I consider it in very good condition. Thanks to Jens Koch for the article.

Peter Young
Weymouth, MA

“WHERE’S THE QC?”

In the December issue, I noticed the maximum possible score for the IWC and Vacheron Constantin pieces tested was 105, not 100. I think this was because the score for “Operation” was shown as a maximum of 10, rather than 5. The test for the Ulysse Nardin watch shows “Operation” as worth a maximum of 5 points.

Marty Epstein
Fair Lawn, NJ

Or, as another reader who noted the same mistake asked pointedly and properly, “Where’s the QC?” We made a hash of this in the December issue. Two of the tests had the “Operation” evaluation with a maximum of 10 points and two with a maximum of 5. You are correct. The “Operation” evaluation has a maximum score of 5. The tests continue to have a scale of 100. We failed to catch the two typos. We apologize for any confusion.

JT

THE QUEEN’S OAK

I want to thank you for the great coverage and stories about Breguet in several previous issues of WatchTime and online at watchtime.com. I read the story of the Marie Antoinette watch with great interest. I am in the U.S. military stationed overseas. Recently my family and I were fortunate enough to vacation in Paris, and we visited Versailles. I remembered the story

about the watch box that Mr. Hayek had commissioned for his remake of the Marie Antoinette watch from the tree near Marie’s cottage (which is more of a small palace), and low and behold, the stump of the tree is still at the site (see attached photo of me in front of it)!

I told my wife and sons the story and they were fascinated by the tale, as I had been. I am a great watch collector, and I am trying to get my 11- and 15-year-old boys interested in horology as well.

Two days later we were at the Louvre, and to my surprise, it was the last day of the Breguet exhibition there! One of the first watches that we viewed was the remake of the Marie Antoinette watch. As indicated in your magazine’s coverage and on watchtime.com, the exhibition was spectacular. We spent nearly an hour admiring the life and works of this watch pioneer.

Thank you for the great coverage of both the story and the exhibition. Without your magazine, we would have never known about the tree at Versailles nor would we have seen the great collection at the Louvre!

Randy Lynch
Stuttgart, Germany

Thanks to you, too. Without you we would not get to see the remains of the famous Marie Antoinette oak at the Petit Trianon!

JT

OCCUPATIONAL HAZARDS

I must say I am concerned about the health of some of your contributors. Mr. DiVincenzo should be fairly safe testing pens. However, Mr. Bernstein drives cars who knows how fast, Mr. Hacker drinks alcohol for a living and Mr. Bernardo smokes cigars to prepare for his column. Do us a favor and make sure they don’t overdo it in their respective fields. I enjoy reading their columns in each issue.

Eric Stein
Virginia Beach, VA

I wonder which is worse these days: writing for WatchTime, which may prove hazardous to



Why 28?



Hacker: "Drinks for a living"

WatchTime welcomes correspondence from readers. Send comments to editor-in-chief Joe Thompson at 274 Madison Avenue, Suite 705, New York, NY 10016 or via e-mail to jthompson@watchtime.com. Please include your full name, city and state, and country (if outside the United States). Letters may be edited for length or clarity. Due to the volume of correspondence, *WatchTime* cannot acknowledge all the letters it receives. However, each one is read in full.

"I AM CONCERNED ABOUT THE HEALTH OF YOUR CONTRIBUTORS. BERNSTEIN DRIVES CARS WHO KNOWS HOW FAST, HACKER DRINKS ALOCHOL FOR A LIVING AND BERNARDO SMOKES CIGARS."

your health, or reading it, which may prove hazardous to your wealth. Whatever the case, we appreciate that you dare to keep reading and are touched by your concern for our care-free columnists. It's the price they pay for the fun of working in the toy department of life. JT

PERFECT EXPLANATION

I've been following with great interest the discussion in your magazine about the 10:10 position of the hands that manufacturers use when showing off their watches. I think equally fascinating is the date that various companies use in their promotional pictures. Patek Philippe always uses either 8 or 18. Glashütte Original and Lange & Söhne always use 25. Others like Blancpain use 31. Longines uses 23. But by far the most common date is 28, used by many firms including Rolex, Omega, IWC, Panerai, Piaget, Zenith and Ulysse Nardin. Note also that Roger Dubuis started off by only making 28 pieces for all its models, though according to your article in the December issue, that is now being adjusted to 88, 288, and 888, depending on the metal used.

So clearly, 28 holds a special significance for the watchmaking community. Why is this? My theory is two-fold. First, 28 is a lucky number to many Asians, especially the Chinese who always favor the number 8. Second, 28 is a "perfect number" whose properties were first defined by the Greek mathematician Euclid in 300 BC. A number can be called "perfect" if all its divisors add up to that number. So the first perfect number is 6, whose divisors are 1, 2 and 3, which add up to 6. The second perfect number is 28, whose divisors are 1, 2, 4, 7 and 14, which add up to 28. The third perfect number is 496 and after that, it's 8128, followed by 33,550,336!

As you can see, perfect numbers are hard to come by (interestingly, all perfect numbers end with either a 6 or 28) and so are considered special within the math community. So if a watch company wanted to use a perfect number for a date (thus implying its watches in some way represent perfection) as well as ensure that the

number selected has lucky properties, the only possible choice is 28.

Siva Rathananthan
Singapore

Your thorough analysis is convincing. Moreover, it's heartening to think that the marketing wizards in watch companies occasionally discuss Euclid. JT

RESCUING HOMELESS MOVEMENTS

Thanks and congratulations for 10 years of *WatchTime*. I have every *WatchTime* magazine ever published, including the October 1999 issue. Watchmaking is my full-time occupation. I am 38 years old and have been at the bench for nearly 18 years.

My apprentices and I have been producing watch cases on a small basis. We machine them to fit homeless movements that are "victims" of the gold rush (cases scrapped for the gold content). Many of them are 0 and 6 size American movements fitted into solid bronze machined wristwatch cases. Jewel count is usually 15 and up. We completely refurbish the movement, which is usually nickel, blue all the visible screws and (inspired by *WatchTime*) make it resemble some of the higher-end Swiss or German watch movements. The result is an American-built watch that is rather attractive.

Strange as it may sound, I do not have a computer, phone or fax. I am Amish. I keep up with what is happening in the watch world by reading *WatchTime* and other magazines. I do not hesitate to say that I have learned more about quality watchmaking from your pages than from any other magazine. Thank your for your "Time"!

Mablon L. Shetler
7676 St. Rt. 62
South Dayton, NY 14138

Mr. Shetler is interested in corresponding with anyone doing similar watch restoration work. He can be contacted in writing at the address above. JT

The escapement cage is mounted on silent blocks that act as shock absorbers.

Cartier's Concept: A No-Adjustment Watch

Cartier unveils the ID One concept watch, an automatic watch it says never needs adjusting.

Cartier's new ID One watch is not for sale; it's for show. It is a concept watch, in a Ballon Bleu case, that Cartier says represents a major breakthrough in watch technology because its movement will never need adjusting. Not in the assembly process, not in the life of the watch on the wrist, not ever. Why not? Because Cartier has used monobloc designs and low-friction materials to produce the watch's components. The watch, says Jean-Kley Tullii, director of Manufacture Cartier in La Chaux-de-Fonds, Switzerland, has been ticking in the workshop since November 2008. It is a one-of-a-kind experimental piece. "It will never reach the market," Tullii says, "but it embod-

ies elements that will appear in other watches."

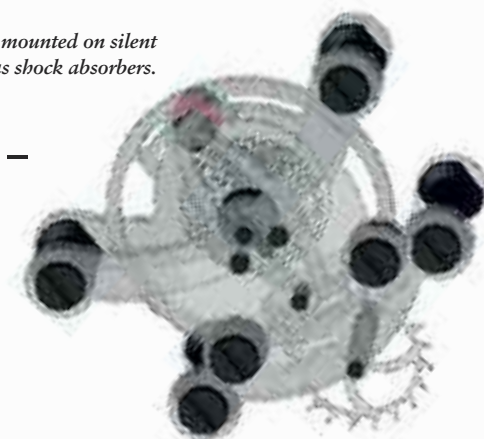
Cartier unveiled ID One (the initials stand for "innovation" and "development") to the international watch press in November at its giant *manufacture* in La Chaux-de-Fonds, where nearly 1,000 people produce watches. Cartier showcased the various components it has developed that it predicts will one day eliminate the need for any watch regulation, like the Zérodur hairspring, the carbon crystal balance wheel and tungsten carbide oscillating weight coated with ADLC (amorphous diamond-like carbon). It also showcased a newfound expertise in high mechanical watch manufacturing that will surprise many who

know Cartier primarily as a legendary jewelry retailer and manufacturer. The development of the ID One shows clearly that Cartier has gotten very serious about its men's-watch business.

Cartier has been in La Chaux-de-Fonds for nearly 40 years. For most of that time, it has relied on third parties for watch movements. To a great extent, it still does. In the past few years, though, Cartier has invested heavily to become a vertically integrated watch producer and has begun making mechanical movements in-house. "We are more and more deeply anchored in movement making," Tullii says. "That led to the ID One."

What Cartier did was focus on the three elements of a mechanical movement that traditionally need adjustment — the balance wheel, hairspring and escapement. Cartier says it has created a "perfect" balance wheel by manufacturing it out of carbon crystal in a monobloc construction (cleverly designed in the shape of Cartier's double-C logo). The traditional adjusting screws on the wheel are gone since they aren't needed.

Cartier claims it has made the hairspring ultra-precise (two seconds per day) by using a material called Zérodur and a uniform design. All the hairsprings are alike; they have the same length and are attached at both ends. There is no need to modulate the length of the hairspring using an index assembly. Zérodur, a material used in the automotive industry, is extremely light and unaffected by temperature changes. Zérodur hairsprings are four times lighter than standard hairsprings. (Cartier says it is still testing its



Cartier's ID One concept watch

Zérodur hairsprings; it used a silicon hairspring in the ID One.)

As for the anchor escapement, its anchor and escape wheel are made of carbon crystal in a monobloc construction. They are perfectly matched at the time of assembly, eliminating any need for a watchmaker to adjust them using pallet stones on the anchor. The ID One's anchor has no pallet stones.

The ID One sports a number of other innovations. The hairspring, balance wheel, anchor, escape wheel and escape-wheel staff are held in a carbon crystal cage mounted on silent blocks that serve as shock absorbers, giving the watch superior shock-resistance. (The cage is visible through an opening at 6 o'clock on the watch.) The watch case, made of a niobium titanium alloy, also absorbs shocks.

The use of the carbon crystal, Zérodur and titanium (for the escape-wheel axis) protects the watch from magnetic fields and temperature variations.

Top to bottom: The monobloc balance wheel, shaped like the Cartier double-C logo, is made of carbon crystal; Cartier's Zérodur hairsprings are four times lighter than standard hairsprings; the tungsten carbide, bat-wing rotor is coated with ADLC.

The new materials also have a very low friction coefficient. Those that aren't made of carbon crystal are coated with ADLC (amorphous diamond-like carbon). The Batman-styled rotor, for example, is made of tungsten carbide coated with ADLC. These materials do not need liquid lubrication, making traditional lubricants unnecessary.

The result, Cartier says, is a watch that is "insensitive to the aggressions of the environment — shocks, oil aging, wearing, magnetic fields, and temperature variations." No word on when Cartier will begin introducing the new materials in production models, but it's not likely to be long.

— Joe Thompson



Calibre 89: 5 Million Swiss Francs

The yellow-gold version of Patek Philippe's Calibre 89 brought the highest price of 2009 for any timepiece at auction. It went for 5.12 million Swiss francs (just under \$5 million), including sales commission, at a sale held Nov. 14 and 15 in Geneva by Antiquorum Auctioneers. The watch is one of four Calibre 89 watches (the others are in white gold, rose gold and platinum). Patek Philippe made the watches, the most complicated timepieces in the world, to mark its

150th anniversary in 1989. Among their many, many special features are a split-seconds chronograph, star chart, perpetual calendar, equation of time indicator, grande and petite sonneries, tourbillon, thermometer, sunrise and sunset indicator, and century-leap-year corrector. Calibre 89 is really more like a small clock than a watch: it is 88 mm wide, 41 mm thick and weighs 1.1 kilos. It was Antiquorum that first sold the piece in 1989. That year, the price in Swiss francs was just slightly lower: SF4.95 million (about \$3 million at the time). In 2004, the same auction house sold the white-gold version of the watch for SF6.6 million, the highest Swiss-franc price ever paid at auction for a Calibre 89 watch (at the exchange rate of the time, it was equal to about \$5 million).

Front and back views of Patek Philippe's Calibre 89



On Our Web Site

Among the stories available at www.watchtime.com:

- "Hartmut Kraft Reboots Chronoswiss": How the German-born watch aficionado and lawyer Hartmut Kraft plans to resuscitate the Chronoswiss brand in the United States
- A report on the official opening of Hublot's new *manufacture* in Nyon, where the firm is producing its new UNICO movement
- An interview with Omega CEO Stephen Urquhart. He discusses in-house movements, the Olympics, the Moon Watch, and more.
- Quiz: The Year In Review. Test your knowledge of what happened in the watch world in 2009.
- Live From SIHH: Look for online editor Mike Disher's regular updates on new watches being unveiled at the SIHH luxury-watch fair in Geneva that runs January 18 through 22. Disher will also file reports on watch companies exhibiting off-site during the fair.

Countdown to Basel

Mark your calendars: Baselworld, the world's biggest watch fair, will be held March 18 through 25 in its longtime venue, the bustling Messeplatz fairgrounds in Basel, Switzerland. Unlike most watch shows, which are open only to the trade, Baselworld admits the public, too.

Last year, Baselworld attracted 93,900 visitors — retailers, suppliers, and watch fans — and 1,952 exhibitors, consisting of both watch and jewelry companies. The watch exhibitors, who occupy more than half the fair's floor space, range from mass-market companies such as Timex and Fossil to mid-priced ones like Seiko, Citizen and Bulova to prestigious brands such as Patek Philippe and Rolex.

Baselworld is a bellwether of watch trends and a barometer of the economic climate. For that reason, it attracts hordes of reporters and editors: 2,973 last year, only a slight drop from the year before despite the economic downturn. (Overall attendance was down 12%.) It is the most-publicized event in the watch world.

The show is open from 9 a.m. to 6 p.m. every day but the last, when it closes at 4 p.m. A one-day pass is 60 Swiss francs (about \$60), an eight-day pass SF150. Anyone considering going to the fair will find helpful information at www.baselworld.com: details about the event and venue, travel, lodging (probably in a nearby town rather than in bursting-at-the-seams Basel) and various services available for visitors.



Débaufre's Triton 2000m

Débaufre's Deep Diver

This new divers' watch from Débaufre, the Triton 2000m, has, as its name suggests, a water-resistance level of 2,000 meters. Like all the watches in the Triton series, it contains the automatic ETA 2824-2. The case is steel and 45 mm in diameter and has a screw-down crown. The dial is decorated with a wave pattern and the markers and hands coated with orange and white Super-Lumi-Nova. The bracelet comes with a divers' extension. The crystal is sapphire. The suggested retail price of the watch is \$1,250.

Watch Executive Watch

The wave of changes in the Swiss watch executive suites rolls on:

- Gerald Roden, the long-time CEO of Bulgari's Gerald Genta/Daniel Roth subsidiary has left the company. No successor was announced.
- Manuel Emch, until recently the CEO of the Swatch Group subsidiary Jaquet Droz, has joined Romain Jerome as CEO.
- Richemont Executive Chairman Johann Rupert has added "CEO" to this title, effective April 1. He replaces Norbert Platt, who left Richemont at the end of the year.

Since the Baselworld fair in March, there have been changes at the top of a dozen Swiss and German watch companies. These firms include A. Lange & Söhne, Zenith, Baume & Mercier, Genta-Roth, Wyler Genève, Jaquet Droz, Concord, Technomarine, Rodolphe, and Romain Jerome.

The same syndrome has occurred in the United States. Brands that recently have changed their top executives here include Cartier, A. Lange & Söhne, Roger Dubuis, Girard-Perregaux/Jean-Richard, Corum, Raymond Weil, Zenith, and Harry Winston, Inc.



Emch



Rupert



Roden

TAG Heuer's new
Silverstone in blue



CEO Jean-
Christophe Babin



TAG Heuer Turns 150

The Swiss brand celebrates a century and a half with the reissue of a classic timepiece and a new movement.

If the revelation that TAG Heuer, one of the leading manufacturers of Swiss-made chronographs, is turning 150 years old this year catches you by surprise, you're not alone. It was at the proverbial last minute that those involved with the brand discovered the anniversary was imminent. "We had been so busy, so focused on the future," says Jean-Christophe Babin, TAG Heuer CEO, "that it was only about 18 months ago that we realized the company would soon be 150." According to Babin, the recent milestones that have preceded the brand's birthday — the opening of the TAG Heuer 360 museum in Switzerland, the commercial debut of the belt-driven Monaco V4 watch — were as much the result of serendipitous timing as long-range anniversary planning.

Coincidentally or no, however, 2010 is shaping up to be a big year for TAG Heuer, the watch brand founded in 1860 by Edouard Heuer as Heuer & Co. S.A., and today a cornerstone of the LVMH luxury group. Much of the excitement revolves around two projects: the release of the re-engineered Silverstone watch and the introduction of the brand's new movement, Caliber 1887.

The Silverstone, named after the famed racetrack west of London that is home to the British Grand Prix, is a limited-edition reissue of the now-classic chronograph introduced by Heuer in 1974, and worn by, among others, Formula 1 racing legends (and early TAG Heuer ambassadors) Emerson Fittipaldi and Clay Regazzoni as good-luck charms.

The watch is faithful to its vintage predecessor, with its square stainless-steel case with rounded edges; square-shaped subdials (running seconds at 3 o'clock, chronograph minute counter at 9); perforated alligator strap; and even an old-fashioned Heuer logo, replacing the modern TAG Heuer logo, at 12 o'clock. The new Silverstone (available in black or brown dial with matching colored strap) uses Calibre 11, with a Dubois-Dépraz module, as its movement — the same one as in TAG's 40th-anniversary Monaco watch — which allows the same configuration of counters, crowns and push-buttons as the original. The crystal has been upgraded to sapphire from the original's Plexiglas, and each of the 3,000 numbered pieces features a 150th anniversary engraving on the caseback.

Babin reveals that the decision to resurrect the Silverstone was in large part due to the influence of the original watch's fervent fans and its popularity on Internet forums. "We knew we were going to do another reissue for the anniversary," he recalls. "The only question was,

The Silverstone's caseback reveals Calibre 11 and special anniversary engravings.





which one? We selected four or five old models and started a discussion online. When we saw the passion for the Silverstone, the choice was obvious. And much like with the Monaco, we changed very little [in the modern version], except that the movement is more reliable.”

The oscillating pinion was developed by Heuer and patented in 1887.



Babin is also excited about another movement, namely Caliber 1887, TAG Heuer's latest chronograph caliber. It is named for the year that Heuer patented the first oscillating pinion, a component now found at the heart of nearly every mechanical chronograph. Caliber 1887's debut in 2010 brings the total number of chronograph movements TAG Heuer uses in its watches to seven — more, the company claims, than any other luxury brand. The movement's mainplate, bridges, and oscillating weight plate are produced at the company's industrial facility in Cornol in the Swiss Jura; the balance spring, pallets and escape wheel come from Nivarox. The entire movement is assembled in an ultra-modern, dust-free workshop at TAG's headquarters in La Chaux-de-Fonds.

With a diameter of 29.3 mm, 39 jewels, and a total of 320 working parts, Caliber 1887 uses a blued column wheel to control stop, start and reset functions, and oscillates at a speedy 28,800 vph. The oscillating pinion, from which it derives its name, consists of a mobile stem and two pinions, and adds to the chronograph's precision. Caliber 1887 will be produced in high volumes and is intended to serve as the base caliber for more complicated watches in the future.

“We are very ambitious, and we need to make sure that 10 years down the road, there will be enough movements to support our line,” says Babin of the decision to produce the new caliber. It is also, he says, a matter of brand prestige. “Just as a comparison, if you buy a Porsche 911, you want a flat six engine; you don't want a Volkswagen engine or something else that could be found in 10 other brands. We are supporting our growth as well as defining our brand for the savvy consumer.” Babin says Caliber 1887 will likely make its debut in one of TAG Heuer's iconic watches like the Carrera or Monaco. Other 150th anniversary projects are expected to be unveiled at the Baselworld watch fair in March.

— Mark Bernardo

Calibre 1887 brings the total number of chronograph movements used by TAG Heuer to seven.

What company introduced the world's first digital watch?



Quartz at 40

The quartz watch celebrated its 40th birthday on Christmas. Test your knowledge of its first four decades.

1. On Dec. 25, 1969, Seiko introduced the world's first quartz watch. What was it called?

- A. The Exceed Gold
- B. The Quartz Astron
- C. The Pulsar
- D. The Laurel

2. What company introduced the world's first digital watch?

- A. Omega
- B. Texas Instruments
- C. Hamilton
- D. Seiko

3. The launch of the first digital watch was delayed for two years after the watch's unveiling at a press conference because:

- A. It was too costly to make.
- B. It used up too much power.
- C. It was too heavy to wear.
- D. Its display was hard to read.

4. What percentage of watches exported from Switzerland in 2008 had quartz movements?

- A. 58.4
- B. 72.5
- C. 83.5
- D. 93.5

5. Quartz watches represented what percentage of the value of all Swiss watch exports in 2008?

- A. 30
- B. 50
- C. 60
- D. 70

6. What company brought to market the first solar-powered quartz watch?

- A. Citizen
- B. Seiko
- C. SMH (now the Swatch Group)
- D. Casio

7. In what year did worldwide production of quartz watches first surpass that of mechanical ones?

- A. 1973
- B. 1977
- C. 1981
- D. 1985

8. How thick was the quartz-powered Concord Delirium IV, the thinnest watch ever made?

- A. 0.98 mm
- B. 1.98 mm
- C. 2.25 mm
- D. 2.98 mm

9. Which of the following is true of quartz watches?

- A. COSC does not certify them.
- B. Their quartz crystals vibrate at 32,876 times per second.
- C. Their precision is unaffected by extreme temperatures.
- D. Their oscillators generate piezoelectricity.

10. The plastic Swatch watch has what unusual feature?

- A. A rechargeable battery
- B. A movement that is integrated into the case
- C. A thermo-compensated oscillator

D. Two "sympathetic" quartz crystals

11. The average quartz watch is accurate to within:

- A. One second per day
- B. Two seconds per day
- C. One second per month
- D. None of the above

12. Citizen's light-powered quartz watches are called:

- A. Solar-Drive
- B. Eco-Drive
- C. Lumi-Drive
- D. Ray-Power

13. Seiko's motion-powered quartz watches are called:

- A. Kinetic
- B. Autoquartz
- C. Mecaquartz
- D. Oscillo-quartz

14. What brand uses the name "SuperQuartz" for many of its quartz watches?

- A. Omega
- B. Breitling
- C. Rolex
- D. IWC Schaffhausen

Answers: 1B; 2C; 3B; 4C; 5A; 6A; 7C; 8A; 9D; 10B; 11D; 12B; 13A; 14B



MARTY BERNSTEIN

Luxury Fuel Duel

Premium automakers roll out new fleets of alternate-fuel vehicles for 2010.

There's gonna be a shootout at the fuel-economy corral. To meet the government's mandated increase in fuel efficiencies and lower emissions in automobiles by 2016, Audi, BMW, Cadillac, Lexus and Mercedes-Benz — the top selling luxury automotive brands — have invested millions in R&D to offer a variety of alternative fuel sources starting with the 2010 model year.

Currently, there are three primary alternative fuel choices for powering luxury vehicles — hybrid, diesel and electricity. Under development are others including hydrogen, fuel cells, natural gas, biodiesel and combinations of one or more of these. Start-ups Fisker and Tesla will offer new electric cars. Ethanol is history.

Until now, most alternate-fuel vehicles were small to medium-size, lower-priced, and limited in body style selection. Increasingly, however, the premium marques have joined the party, rolling out choices for their affluent customers. Here's the short list.

Audi is committed to clean diesel engine technology as its alternate fuel source. It entered the U.S. in 2009 with the Q7, a popular SUV with a 3.0 clean diesel engine, which has been updated for 2010 as Q7 TDI (turbo direct injection) diesel. The 2010 A3 TDI, Audi's second diesel vehicle, is a front-wheel drive, four-door compact luxury sedan with a 2.1-liter clean

diesel engine that delivers the highest highway fuel economy in its category — 42 mpg — using EPA estimates. Suggested price for the A3 TDI is \$29,950, while the Q7 TDI is \$50,900. Meanwhile, Audi's all-electric e-Tron concept car is scheduled for production in 2012.

BMW has two new hybrids entering the U.S. market in addition to its respected diesel powered cars. The new ActiveHybrid X6 (\$89,725), at dealers now, is a luxury sports activity coupe, the first with full hybrid drive. It's powered by a 400-hp V8 twin turbo gasoline engine and two electric motors that deliver an amazing 575 pounds of torque. At the same time, it reduces fuel consumption by 20% versus comparable vehicles with traditional gasoline engines. Arriving in spring is BMW's 7 Series flagship sedan (not yet priced), now available as a hybrid, which combines a V8 440-hp gasoline engine, eight-speed automatic transmission and an electric motor. The energy supply comes from a lithium-ion battery developed just for this automobile. Fast? How about zero to 60 mph in 4.8 seconds?

Lexus took advantage of Toyota's pioneering hybrid technology when it created the first luxury hybrid vehicle and has recently added two new hybrids. The 2010 Lexus HS 250H (\$34,200) is the first luxury sedan specially en-

gineered as a hybrid. Powered by Lexus's first four-cylinder, 147-hp engine that works with an electric motor, it powers up to 187 hp. EPA ratings of 35 mpg city and 34 mpg highway give it one of the best combined ratings for luxury vehicles. The RX 450H is the hybrid version of the RX 450, Lexus's top sales model. Powered by a 3.5 liter V6 engine with electric motors, it tops at 295 total hp while delivering performance similar to a V8's but with better fuel economy than most four-cylinder engines. The ratings are 30 mpg city and 28 mpg highway for the front-wheel drive (\$41,660) and 29 average for the four-wheel drive (a couple thou more).

This spring, **Mercedes-Benz** adds two new hybrid vehicles to its alternate fuel portfolio of three Blue Tech diesels. There's the new ML 450 hybrid, an SUV that boasts good comfort and handling, but is not a gas guzzler. Hybrid power from a V6 335-hp engine combines with two electric motors to get 46% better fuel economy than a comparable V8-powered ML550. And, this SUV can run in three modes: engine and electric or either alone. For those who'd like a sleek hybrid sedan, Mercedes offers its S400 model. A lithium-ion battery designed for automotive use works in combination with a 20-hp electric motor and the 275-hp V6 gasoline engine to deliver a respectable 19 mpg city and 26 mpg highway ratings. That's 26% better than the V8 S5500.

Which luxury car brand will emerge victorious, with vehicles that are the most ecologically and environmentally acceptable to both demanding regulations and customers? Stay tuned. ○



Audi's e-Tron is an all-electric concept car.



JAN DIVINCENZO

Eye Candy

Atelier Simoni's ID is not only pretty, it might also be leak-proof.

In 1919, Armando Simoni, Bolognese toolmaker, left his job and started manufacturing pen components, designing and engineering his own tools and dies for the purpose. In 1925 he registered his operation as Officina Meccanica Armando Simoni (OMAS) and made some astute business moves. He acquired surplus ebonite and celluloid to make

feeds and barrels, and developed curing processes to make celluloid more durable and lustrous. An assiduous student of Greek architecture, his Attic sense of balance and elegance went into his creations. The name Simoni came to

be associated with the beauty, ingenuity and business savvy that have made OMAS one of the most respected pen manufacturers on the planet.

A few months back, I saw a pen that I immediately recognized as bearing OMAS traits: flat-ended, subtly curved and balanced, with a clip formed of a single strip. The pen's light-brown, matte titanium presented itself not in the heavy, industrial manner of some titanium pens but lightly, elegantly, almost like fine confectionery. I squinted until I could bring the tiny tag into focus: virtually \$2,000. Above it, a small sign read, "Atelier Simoni."

Intrigued by this piece of pen candy, I had to know its story.

When Armando Simoni passed away in 1958, he left OMAS to his daughter Raffaella Simoni Malaguti and her husband Angelo Malaguti, who have since run the company, along with their son Gianluca Malaguti Simoni. A few years ago Raffaella and Gianluca, who have produced nearly 500 pen models together, launched their own venture, Atelier Simoni. The pen in the display case its first product, the Collection ID.

The ID is definitely a European pen: when posted, the lengthy cap doesn't clear the turning knob, making the pen too lengthy and top-heavy to be wielded comfortably. Rather, the cap is designed to stand apart and be admired. The brushed-steel clip is elegant and minimal, featuring a hidden spring mechanism. The 18k-gold nib is sweet and smooth, issuing as it does from an OMAS source. In appearance, the ID is a beautiful pen, which said, brings me to the controversial part: the filler.

In the ID's filler and feed, Atelier Simoni claims to have solved two problems that have plagued fountain pens from the get-go: leakage due to changes in temperature and air pressure, and ink desiccation due to evaporation through the feed. Pen history is replete with partial solutions to these problems, from Parker's Lucky Curve of the early 1900s, which employed "capillary attraction" to drain residual ink out of the curved feed tube, allowing air pressure to escape; to Waterman's Edson of the 1990s, which was "guaranteed leak-proof to 30,000 feet."

Atelier Simoni, like many companies, has cloaked its ostensible solution in the jargon of science: "...inorganic polymers based on a chain of silicon-oxygen and

organic functional groups (R) associated with silicon atoms for optimal operation." The effect is simpler: a silicon sac attached to the filler's piston that flexes with the ink, thus minimizing air pockets and adapting to changes in pressure; and a shut-off valve behind the feed, actuated by two small buttons on the grip when the pen is capped. In short, Atelier Simoni's "Industrial Patent SMC" puts the ink in a pliant reservoir and seals it off when the pen is not in use.

The verdict on the success of this two-part solution isn't in yet. It's worth asking whether the complete elimination of leakage and dry-outs, infrequent and preventable as they are in high-quality pens, justify adding components. Fountain pens still depend on capillary action to draw and regulate the ink flow; thus they depend on open communication between nib, feed and reservoir. So far, added parts to regulate or staunch this flow have created problems — to the extent that, for most manufacturers, preventing the possibility of occasional seepage after a plane ride has not been worth detriments to the pen's performance and maintenance.

Truly revolutionary and abiding solutions more often exploit natural properties — capillary action for Waterman's safety feed, the vacuum for Kovak's piston and Sweetser's plunger-vac, Goodyear's vulcanization, etc. These are more than mechanisms; they are discoveries. What Atelier Simoni has given us in the ID is a beautiful pen with a couple of added components, and the occasion, after a long hiatus, to reconsider the existing filler-feed paradigm. ○



The brown titanium ID pen by Atelier Simoni



RICHARD CARLETON HACKER

The Unknown Elegance of Armagnac

France's other great eau-de-vie emerges from Cognac's shadow.

In Bordeaux, at La Tupiña restaurant on 6 Rue de la Porte de la Monnaie, customers can choose from the numerous bottles that line the walls and pick an Armagnac to match their birth year. By contrast, at the popular Vertical Wine Bistro at 701 Raymond Avenue in Pasadena, California, general manager David Haskell has gained prominence by stocking three Armagnacs. After all, in America, Armagnac is not the first word that rolls off the lips when someone asks for a digestif.

"I carry Armagnac because I like to drink it," says Haskell. "It relaxes me. Single malt has too many spices, and I find Cognac has too much fruit. But Armagnac has the right barreling [aging], so it's smoother and settles me down after a long day, without being heavy or upsetting to my stomach. It's lighter, more gentle, and more sophisticated."

In a country where Armagnac is not exactly the most popular after-dinner pour, that is quite an individualistic

stance. But then, what else would you expect from a sommelier who wears a Panerai Power Reserve to work ("It's so big I've accidentally broken five Bordeaux glasses with it," Haskell laments) and also owns a Cartier Pasha and a Baume & Mercier? Often called "the dying spirit," because few know what it is, Armagnac is overshadowed by Cognac, its more robust brother 150 miles to the north. And yet, it's been around 200 years longer than Cognac, and is made from three of the same grapes, Ugni Blanc, Colombard, and Folle Blanche. Both Cognac and Armagnac are aged in oak barrels. But there the similarities end.

While both are white-grape brandies, some Armagnacs also use Baco 22A, a hybrid fourth grape developed in the 1920s, which is not allowed in Cognac. And unlike Cognac, which is pot-distilled twice, Armagnac is distilled once in column stills, although in 1972 the law was amended to permit double distillation. Nonetheless, most producers stay with a traditional single distillation, which results in a slightly spicier spirit.

The Cognac region has benefited from the Charente River, which transported Cognac and its reputation to the rest of the world. By contrast, the Armagnac region is landlocked in Gascony, in southwestern France. Thus, its fame was confined. There are other geographical differences as well, as the climate and soils of Cognac are quite different from those of Armagnac.

Finally, while Cognac is dominated by "the big four" (Martell, Hennessy, Courvoisier, and Rémy Martin), Armagnac is produced by numerous small distilleries with limited resources for marketing. I

witnessed this firsthand during the 2007 VinExpo in France. As one of the wine-and-spirits judges, I sampled a rich and floral 20-year-old Castarède Bas Armagnac Hors D'Age. Impressed, I asked Mme. Florence Castarède, the sixth generation proprietress of this historic 1832 distillery, who her U.S. importer was. Alas, she had none.

Although Armagnac and Cognac use some similar age classifications such as VSOP (Very Special Old Pale), XO (Extra Old), and vintage bottlings, Armagnacs mature differently — and longer. Even the most exceptional Cognacs are rarely older than 50 years, but some Armagnacs can be aged for as long as 80 years.

"Armagnac, because of its structure, is the spirit that has the most potential to age," says Alexandre Gabriel, president of Cognac Ferrand. "Armagnac, when distilled once, has a lot a structure and taste elements and needs to age longer so these elements are well 'digested.' It usually needs more age than Cognac to show its best."

Currently, Cognac Ferrand imports two Armagnacs under its Cerbois label, named after prized vineyards in the Bas-Armagnac region, the largest and best of the three Armagnac-producing areas (the other two are Armagnac-Ténarèze and Haut-Armagnac). Cerbois's delicate VSOP is aged for eight years and its voluptuous XO is aged for 20 years. But some of Ferrand's Armagnacs go back as far as 1888.

So the next time you feel like a snifter to settle that braised short rib dinner and chocolate soufflé dessert, try a glass of Armagnac, and experience what it's like to discover the unknown. ○

Watch and Armagnac aficionado David Haskell of Vertical Wine Bistro in Pasadena, California, offers three precious pours (l. to r.): Domaine Boingnères Réserve Spéciale; 1988 Château de Briat Baron de Pichon-Longueville; and 1989 Laberdolive.



Photo: Richard Carleton Hacker

Montecristo White Label is an extension of the Dominican Montecristo line.



MARK BERNARDO

New Spins on Old Classics

Cuban heritage plus creative, multi-nation blends equal great cigar brand extensions.

Even though Cuban cigars are illegal here in the U.S., it would be naive to think that many of *WatchTime*'s savvy, well-connected, world-traveling readers do not have access to that forbidden fruit. So why, you may ask, would I smoke Partagas, Cohiba and Montecristo cigars made in the Dominican Republic, or Punch and Hoyo de Monterrey made in Honduras or San Cristobal made in Nicaragua, when I can indulge in the Cuban originals instead? Other than being much more readily available (not to mention legal) in the U.S., what advantages might the non-Cuban versions have over their predecessors?

Aside from the acknowledgement that everyone has his own taste — that some might even prefer a Dominican over a Cuban — consider this: the originals use all Cuban tobacco for a (hopefully) consistent flavor profile across the line, whereas their non-Cuban counterparts can blend tobacco from multiple sources to create distinctive brand extensions, many of which are great choices for those who might find the standard versions just a little too, well, standard. Here are a few favorites:

Altadis's Montecristo White Label is the James Bond of Dominican-made cigars — elegantly packaged, smooth on the surface, yet capable of strength, complexity and just the hint of a rough edge. The White Label uses an Ecuadorian-grown Connecticut shade wrapper that is a bit darker and a touch spicier than the baseline Monty's lighter, Connecticut-grown one. Couple that with a filler blend of Dominican and Nicaraguan leaf, and you

have a creamy, nutty smoke that develops some richer, more peppery character as it burns and a lingering, earthy aftertaste. And I've never smoked one whose construction was less than exquisite.

Cameroon wrappers from deepest Africa are treats that you will never find in a Cuban cigar, and one of the best examples is on the H. Upmann Vintage Cameroon, also from Altadis. In addition to the lush, velvety wrapper, the enticing element here is the filler, which blends Dominican and Nicaraguan with a hint of Peruvian, a sparsely used but tasty leaf that adds a hint of spicy-sweet undertone. The hearty draw brings flavors of toasty almonds and bittersweet cocoa and leaves a nice campfire aroma in its wake.

Cuban Romeo y Julietas are among my favorites, but Altadis's Dominican version, while popular, is known by aficionados as a rather mild smoke. Several of its brand extensions are more challenging to an advanced palate, however, like the dark, oily Vintage Maduro line, which is a bold, rich, chocolatey treat. If you're looking for something more Cuban in character, however, there's the Romeo y Julieta Habana Reserve, which features a rich, caramel-colored wrapper from Nicaragua and a well-balanced Nicaraguan/Honduran filler blend. It's a cool-burning, medium-bodied, creamy cigar with notes of coffee and nuts.

From General Cigar, there is the Dominican Partagas line, which has expanded in recent years to include several popular sub-brands. Partagas Spanish

Rosado gets its name from its eye-catching, reddish-brown wrapper grown in Honduras's San Agustin region. That plus the three-nation filler blend (Dominican, Honduras, Mexico) makes for a zesty flavor profile with layers of caramel, molasses and cinnamon. The binder — gritty, spicy, Connecticut broadleaf — adds some oomph to the flavor here as well.

For the full-bodied maduro fan, there's Partagas Black Label, a line whose wrappers are so dark, veiny and oily they probably look downright mean to anyone but a seasoned cigar lover. These are from Connecticut Havana seeds, which actually yield more full-bodied tobacco than broadleaf, and the Nicaraguan/Dominican filler complements them nicely. Black Labels are robust, spicy and earthy, with loads of black pepper and dark chocolate overtones, but unlike other cigars with such scary-looking wrappers, don't leave a harsh finish on the palate.

My closest to a go-to cigar in this category is from General's Punch Grand Cru, a line extension of the Honduran-made Punch — specifically the Punch Grand Cru II Maduro, an exquisitely square-pressed torpedo with silky, cocoa-brown Ecuadorian Sumatra wrapper (non-maduro Grand Crus have Connecticut shade wrappers) and a smooth, savory triple-threat filler of Dominican, Honduran and Nicaraguan leaf. Smoke one with your favorite single malt and don't be surprised to find yourself instinctively reaching for another. ○

Nivarox-FAR: Escapements “R” Us

A rare glimpse inside the Swatch Group subsidiary that produces the vast majority of Swiss watch escapements.

BY THOMAS WANKA

If ETA, the giant manufacturer of watch movements, is the heart of Switzerland's Swatch Group, then Nivarox-FAR is one of that heart's chambers. The company specializes in the production of escapements and oscillators. Headquartered in Le Locle, it has manufacturing facilities scattered around Switzerland's Jura Mountain watchmaking region, in Villeret, St.-Imier and Fontaine. All in all, Nivarox-FAR has 28,600 square meters of production area and 1,000 employees.

The present-day form of Nivarox-FAR dates from Switzerland's quartz crisis when, in 1984, little Nivarox SA merged with giant Fabriques d'Assortiments Réunies (FAR). FAR was five times larger than Nivarox and had been doing business under this name since 1932; it included various businesses that produced watch components in Le Locle. Nivarox was born around the same time, in 1933, with the perfecting of a manufacturing process for balance springs by Dr. Reinhard Strau-



The silicon escapement bearing the laser-engraved name and logo of Omega



Caliber 8611 with annual calendar is currently the most highly complicated version of Omega's co-axial manufacture caliber.

mann in his laboratory in Waldenburg, Switzerland. The firm's name was derived from a combination of German and French acronyms: "Nivar" comes from "*nicht variabel*" (not variable) and "ox" comes from "*ni oxydable*" (nor oxidizing). Nivarox belonged to ASUAG, Switzerland's largest watch combine, until 1977. After the merger with FAR, the business was integrated into SMH, which was the precursor of today's Swatch Group.

Just how the newly merged and struggling Nivarox-FAR survived the quartz crisis is the stuff of legend in the Swatch Group: in a nutshell, it was saved by the mechanical Swatch watch. In the 1980s, with quartz watches all the rage, demand for mechanical watches slowed to a trickle. Nicolas G. Hayek, the founder of the Swatch Group, came up with a scheme to create orders for Nivarox-FAR. Hayek describes the plan he hatched in those dark days: "In order to avoid having to close Nivarox-FAR, we decided to make a mechanical Swatch. Everyone thought

we were crazy, but we explained that some people in developing countries didn't yet know how to change the battery in a quartz watch. Of course, that explanation was nonsense, but we didn't want to admit that we had no orders for Nivarox-FAR and that otherwise we would have had to shut it down for lack of work. That's how we saved Nivarox-FAR — in the nick of time!"

In retrospect, we can see that if Hayek hadn't kept production going at the site, there would no longer be a mechanical watchmaking industry in Switzerland today. Escapements comprise 90 percent of the firm's current production; the remaining 10 percent consists of other small components such as indices for dials, screws, wheels and springs — three million pieces in all.

LE LOCLE HOUSES the administration and the development departments. There is also a machine-making workshop where 50 workers construct special machines that cannot be obtained elsewhere.

Recently, the company moved operations from five different locations into a large new factory in Fontaines, in the Jura Mountains. Here Nivarox-FAR manufactures and assembles complete barrels, manufactures golden indices and little windows for high-quality dials (it produced 1.45 million indices, all in gold and all for Omega, in 2009), and smelts the alloys needed for the manufacture of balance springs and mainsprings. Here, too, it uses LIGA technology, which combines photolithographic and galvanoplastic (i.e. giving galvanic coatings to metals) methods to produce metallic micro-structures with highly complex geometries.

Fontaine is also where Nivarox-FAR makes balance springs and escapements made of silicon, primarily for Breguet and Omega. Nivarox-FAR had been manufacturing components from silicon at a facility in Marin, Switzerland since 2005. By 2008, it had produced some 50,000 silicon components, 80 percent of them balance springs. The total annual production is now slated to increase to 100,000 components now that the division has moved to Fontaines. The blue smocks worn by industrial workers will be largely replaced

Assembling individual regulating systems in a Nivarox-FAR assembly hall





A regleuse manually calculates the length of a spirally coiled balance spring.



Nivarox-FAR makes millions of balance springs like these each year.



Swatch Group flags fly outside the Villeret plant.

by the white overalls worn by clean-room personnel. The Swatch Group has invested millions of Swiss francs in silicon technology over the past few years.

Nivarox-FAR also produces mainsprings; mainspring production topped three million in 2009. It plans to deliver more than five million mainsprings in 2010, provided there are buyers. In conversations with Nivarox-FAR executives, one detects annoyance over the number of cancelled orders in 2009 from watch companies, which, just one year earlier, had accused Nivarox-FAR of treating them like stepchildren and deliberately causing shortages.

THE NIVAROX-FAR facility that we visit is in Villeret, a little village in the Jura's St.-Imier valley that descends from La Chaux-de-Fonds down towards Bienne. The Swatch Group took over this production site from Cartier after that Richemont brand moved to a new factory in La Chaux-de-Fonds. After a complete renovation, the Villeret plant opened as a new Nivarox-FAR facility in May, 2008. There it makes escapements for the Swatch Group's haut-de-gamme division, and above all for the Omega Caliber 8500, which debuted in 2007.

Caliber 8500 was constructed around the co-axial escapement that George

Daniels developed in 1970. The vast majority of mechanical watches, more than 90 percent, use the Swiss lever escapement. This type of escapement was first developed in 1870 and is based on a construction first used by Thomas Mudge in 1760. Daniels's brainchild was the first new development in this field in more than 200 years, but even such renowned firms as Rolex, Patek Philippe and Zenith were unwilling to dare to try to industrialize it in the 1980s.

The person who saw potential in Daniels's invention was Hayek. He decided to manufacture it in the 1990s so that the Omega brand would have a unique selling point. The industrialization began in 1994 and involved Nivarox-FAR. Production reached the triple-digit mark for the first time in 1999. More than 100,000 have been produced annually since 2003. Producing the co-axial escapement has enabled Nivarox-FAR to attain a new level of manufacturing quality, says

Christian Feuvrier, Nivarox-FAR's manager of marketing and sales. To produce co-axial escapements the Nivarox-FAR team had to master nano-mechanics, with manufacturing tolerances of 1/10,000th of a millimeter. He notes that escapements made in the 1980s would not be good enough to pass through the firm's quality control today.

The manufacture of a co-axial escapement requires a total of 37 processing steps. The high quality of the finished products is assured in advance by the accuracy of the manufacturing process rather than ex-post-facto by rigorous post-production monitoring. The factory has an 11-person quality committee. Another 30 specialists work on the production lines. The factory employs high-tech modern equipment to produce the co-axial. An optical three-dimensional measuring system, using special cameras that take into account the function of a component, is only one example. ○



Deconstructing **SEIKO**

*The Seiko Group's structure
makes 3D chess look simple.
Here's how the world's
most complicated watch
company came to be.*

BY NORMA BUCHANAN



EPSON

セイコーエプソン株式会社
塩尻事業所



*Seiko Epson's
watchmaking
facility in Shiojiri*

The Japanese aren't big boosters, but the Japanese company Seiko has one thing it loves to crow about: it makes more types of watch than any company in the world. In fact, it makes all the types of watch that currently exist: mechanicals, standard quartz, motion-powered quartz, solar-powered quartz, and radio-controlled quartz. It also makes some types that Seiko came up with itself: Spring Drive, a hybrid with a quartz regulator and a main-spring, and Direct Drive, a motion-powered quartz watch that allows you to wind the watch just as you can an automatic mechanical watch.

Not only that, Seiko makes nearly all the components used in these many watch types: from balance springs to quartz crystals, from integrated circuits to the gongs used in its ultra-high-end sonnerie watches. (Jewel bearings and pallet jewels are among the very few watch parts Seiko buys from outside suppliers.) The group's watch-production operations range from vast, robotized assembly lines churning out truckloads of quartz watches to tiny ateliers where highly skilled watchmakers assemble by hand high-complication watches priced at more than \$100,000.

The company has another world championship title, one it doesn't often brag about. Seiko is, hands down, the world's most complicated watch company — a sprawling thicket of companies, really, rather than a single entity, which defies understanding even by many watch-industry veterans. Seiko's billion-dollar-plus watch business is part of a diversified manufacturing and sales colossus with about 90,000 employees worldwide and total sales of roughly \$16 billion.



*The Daini-Seikosha factory
in the 1930s*



*Making pocketwatches at
the Seikosha factory in 1914*

Seiko at a Glance

The Seiko Group consists of two giant, publicly held, separate companies, each with many subsidiaries and affiliates. They make 12 million finished watches and 336 million movements per year.

Seiko Epson. Net sales of \$12.6 billion, 78,000 employees. Biggest product is Epson printers. Manufactures finished watches and watch components, including movements. Owns Orient Watch Co. Watches make up about 5 percent of total sales (not including Orient Watch sales).

Seiko Holdings. Expected consolidated net sales of \$3.1 billion for current fiscal year. Has several subsidiaries, two of them in the watch business:

Seiko Instruments, Inc. (SII).

Acquired last year. Net sales of \$2.2 billion for latest fiscal year, 11,000 employees. Widely diversified. Makes finished watches, watch components and movements. Watches make up 15 percent of its total sales.

Seiko Watch Corp. Net sales, about \$1 billion for latest fiscal year. Markets watches manufactured by Seiko Epson and SII. Does not itself make watches.

In addition, a Seiko affiliate, **Time Module**, markets the more than 300 million watch movements that Seiko Epson and SII make each year for companies outside the Seiko Group.

So if you've ever thrown your hands up at the puzzle of how Seiko Epson, say, is related to Seiko Holdings, or what, exactly, Seiko Watch Corp. does and how it relates to Seiko Instruments, you're not alone.

The best way to understand today's Seiko Group is to travel back more than a century, to a far, far simpler time.

SEIKO WAS BORN when Kintaro Hattori, a former apprentice in a clock shop, set up his own business in Tokyo in 1881. In addition to fixing clocks, he also sold them, buying foreign-made models and selling them to local retailers. He called his enterprise, simply enough, K. Hattori.

In 1892, Hattori began manufacturing clocks himself. He christened his factory "Seikosha," a combination of two Japanese words: *seiko*, meaning "precision," and *sha*, meaning "building" or "factory." He continued his timepiece-trading operations under the name "K. Hattori."

The company branched out into pocketwatches in 1895 and, in 1913, wristwatches. In 1917, it was incorporated and became K. Hattori & Co. Ltd. Seikosha was part of the new company. Hattori continued to run his clock store, located in the prestigious Ginza section of Tokyo, selling all the timepieces that Seikosha made. (It's still there, and still owned by Seiko. The store is now called Wako, and its famous clock, high above the street's rushing crowds, is one of Tokyo's most famous landmarks.) In 1923, the Great Kanto Earthquake destroyed the Seikosha factory along with much of the rest of Tokyo, including the K. Hattori office in Ginza. Nevertheless, the next year Hattori introduced the first watch bearing the Seiko brand name. He had moved his company to a temporary location while rebuilding the Seikosha factory, which he finished in 1929.

Kintaro Hattori died in 1934 and his sons took over the business. In 1937, they set up a new company called Daini Seikosha ("second" Seikosha), to take over Seikosha's watch production. The "first" Seikosha would from then on make only clocks and camera shutters, which it had begun producing in 1930.

Five years later, in the middle of World War II, K. Hattori & Co. set up another plant. This one was about 100 miles from Tokyo in the city of Suwa, on Lake Suwa in the Japanese Alps. The Hattoris chose that location because it would be far from the Allied bombing attacks on Tokyo. Watches from both factories, Daini Seikosha in Tokyo and the new factory in Suwa, which came to be known as Suwa Seikosha, were marketed by K. Hattori & Co., the Tokyo-based trading company.

For a time, Suwa Seikosha made only men's watches and Daini Seikosha made only women's. That arrangement didn't last long. As consumer demand began to rise in post-war Japan, the two factories started to compete with each other to make watches to sell to K. Hattori & Co., which would choose which products from the two to bring to market. Each company had its own management and was completely independent of the other. Each was fully integrated, doing its own research and development and making its own components. If one of the companies came up with a promising new watch, the other would

THE SUWA-DAINI RIVALRY
FORCED BOTH FACTORIES TO
MAKE THE BEST WATCHES THEY
COULD AT THE BEST PRICE.



*The Seiko Instruments
watch facility in
Morioka*

find a way to produce a similar one at a lower price or design an improved version of it.

The competition produced great benefits: it forced the two factories to make the best watches they could at the best price. That system continued as the quartz age dawned (it was Suwa Seikosha that developed the Quartz Astron, which in 1969 became the world's first quartz watch to make it to market) and into the '70s and '80s, when quartz watches eclipsed mechanical ones and Seiko reigned as the master of the new electronic technology. Seiko's strategy was to win and keep consumers' attention with a steady stream of new quartz models, propelled by the Suwa-Daini sibling rivalry.

IN THE MEANTIME, the two companies were diversifying their operations. In the 1960s, both began to introduce a wide range of other electronic products. Daini Seikosha brought out measurement and analytical devices, robots and other machines for use in automated factories, and many types of electronic components. Suwa Seikosha also became widely diversified in the electronics category. In 1961, a subsidiary called Shinshu Seiki Co. Ltd. was set up to specialize in various electronic products, including printers. It launched the Epson brand of printers in 1975, and in 1982 was renamed Epson Corp. in honor of it. In 1985, Suwa Seikosha merged with Epson Corp., creating Seiko Epson Corp.

In 1983, Daini Seikosha was rechristened Seiko Instruments and Electronics Ltd. to mark the fact that it now made many types of electronic equipment.

Seiko Epson and Seiko Instruments marketed some of their new products themselves (these included Epson's printers). Oth-



*The Credor Spring
Drive Sonnerie*



The Micro Artist Studio (part of Seiko Epson's Artisan Time Studio), where the most complicated Spring Drive movements are made

ers, including watches, they sold through K. Hattori & Co. (renamed Hattori Seiko Co. Ltd. in 1983), which served as the sales and marketing arm for the factories but did not itself manufacture anything.

But trouble lay ahead for the group's watch operations. Changes in the global economy and the watch business in the mid-1980s forced Seiko Instruments, Seiko Epson and Hattori Seiko to cut some fat from their watch divisions. Above all, that meant cooling the Seiko Instruments/Seiko Epson rivalry. The competition had indeed produced terrific watches, but it was also wasteful. Its time had passed.

A turning point came in 1985. That's when the Group of Five nations signed the Plaza Accord, agreeing that the U.S. dollar should be weakened against the Japanese yen and the West German Deutschmark. By 1988, the yen had doubled in strength against the dollar: the exchange rate had risen to 120 yen/dollar.

The strong yen (*endaka*, as the Japanese called it), wreaked havoc with Seiko's watch business in the United States, its biggest market. Profits disappeared as Seiko's cost of making watches, measured in dollars, doubled in just three years. Watch inventories piled up because Seiko could not afford to sell the

watches it was making at old, pre-*endaka* dollar prices. *Endaka* marked the birth of a huge gray market for Seiko watches, as Seiko factories, its U.S. subsidiary, wholesalers and retailers sought to unload in unauthorized outlets watches that would have been too expensive to sell in authorized channels with a standard mark-up.

The problem was compounded by the fact that, due to the structure of the group, Hattori Seiko had no power over the factories. The factories produced what they wanted; it was Hattori Seiko's job to sell what they made. It could not force them to curb production even as inventories mounted. The factories continued to grind out watches even though Hattori Seiko could not sell them.

At the same time, Seiko was being clobbered by the onslaught of inexpensive fashion watches coming from the newly emerging Hong Kong watch industry.

And so began an era of adjustment, with the company taking several steps to cut costs and thus avert disaster. It shifted much of its production to Seiko-owned factories elsewhere in Asia where labor costs were lower. It automated watch production to the maximum, further saving on labor expenses. Seiko Epson and Seiko Instruments both agreed to stop their destruc-



Seiko makes its own hairsprings, along with nearly all the other components it uses in its watches.



Quartz watches from the Seiko brand's Coutura collection

tive rivalry. The factories resolved to consult more with Hattori Seiko so they would make watches the market wanted to buy rather than tailoring their production to their own needs.

The recipe worked, for a while. Seiko's watch business improved significantly and showed a profit in 1990. But then, in 1992, *endaka* stuck again. Seiko's troubles were aggravated by greater competition in the global watch market and the fact that some major markets, the United States included, were reaching maturity. The company once again lurched into the red.

IN 1997, the group took another stab at streamlining its unwieldy watch operations. It set up a production division within Seiko Corp. (Hattori Seiko had been renamed "Seiko Corp." in 1990) that would handle product design, parts procurement, and other functions that Seiko Epson and Seiko Instruments had previously performed themselves. (Seiko Instruments and Electronics dropped the "Electronics" from its name in 1987 and henceforth became Seiko Instruments Inc., or SII.) The new unit would determine the overall strategy of the group's watch operations, the first time in decades that Seiko had a central authority deciding which watches it would make and how it would sell them.

In 2001, Seiko Corp. continued its restructuring efforts by spinning its watch division off into a separate subsidiary called Seiko Watch Corp. It had been doing the same thing with its other product divisions — camera shutters, clocks, optical products, sporting goods, timing systems and integrated circuits — since 1996. The idea was that by making the watch division its own, independent, discrete entity, the division would be better able to champion its own interests, rather than having them overshadowed by those of the other divisions. With the splitting off of Seiko Watch Corp., Seiko Corp. became purely a holding company. It was renamed Seiko Holdings Corp. in 2007.

The Seiko Group's latest structural adjustment came last year. And it was a whopper. As of Oct. 1, SII became a wholly owned subsidiary of Seiko Holdings (annual sales before the ac-

*SEIKO IS, HANDS DOWN,
THE WORLD'S MOST
COMPLICATED WATCH
COMPANY.*



*Shinji Hattori,
president of Seiko
Watch Corp.*



*An automatic Grand
Seiko model*

OBSERVERS BELIEVE IT IS ONLY A MATTER OF TIME BEFORE SEIKO CONSOLIDATES ALL ITS WATCH OPERATIONS.

quisition, 174 billion yen, or about \$1.9 billion), and hence a sister company of Seiko Watch Corp. The tri-partite structure (two giant manufacturers and one giant sales and marketing arm) that had shaped the company since 1942 was gone: where there were once three Seiko Group umbrella companies, there are now only two, Seiko Holdings and Seiko Epson.

There are almost certainly more changes to come. Although no one at the Seiko Group will discuss its plans, outside observers believe it is only a matter of time, perhaps not much time, before the group consolidates all its watch operations, creating a single watch manufacturing and watch marketing unit. Last year's restructuring was a step in that direction: it brought SII and Seiko Watch Corp. under the same corporate umbrella, with the same management now governing both of them. Improving efficiency has become even more urgent in light of the severe slump in the global watch industry. In November, Seiko Watch Corp. forecast a 29 percent drop in its sales to 66.5 billion yen, or \$747 million, for the year that will end March 31.

Consolidation would mean splitting off Seiko Epson's watch operations and merging them with those of SII and with Seiko Watch Corp. It would be the next logical step toward a slimmer, sprightlier Seiko watch business, observers say.

Ultimately, the new shape of Seiko's watch business will be decided by the Hattori family, which has retained a controlling interest in the Seiko Group companies throughout the group's history. (Reiji Hattori, grandson of Kintaro Hattori, is honorary chairman of Seiko Holdings, and other members of the Hattori family hold other top executive posts within the group. Shinji Hattori, for instance, great-grandson of Kintaro Hattori, is CEO of Seiko Watch Corp.)

FOR NOW, THOUGH, the group's watch operations remain splintered. SII and Seiko Epson maintain a division of labor, with each specializing in different types of watches.

SII makes mechanical watches, both high-end ones, like those in the Grand Seiko and Credor brands, and the lower-end Seiko 5 models. The high-end mechanicals are manufactured by an SII unit called the Shizuku-ishi Watch Studio in Shizuku-ishi, a suburb of Morioka, about 300 miles northeast of Tokyo. The Shizuku-ishi Watch Studio makes mechanical-watch components, including hairsprings, as well as hand-assembling and decorating mechanical movements. It is part of the SII affiliate Morioka Seiko Instruments Inc., which also makes quartz

watches and watch movements. Its vast, automated quartz-watch-production facility is among the largest such factories in the world.

The high-end mechanicals, except for those in the just-launched Ananta collection and the automatic chronograph in the Velatura collection, are not marketed in the United States. Most are sold in Japan and a few other countries in East Asia. Some Seiko 5 models are sold in this country, but the biggest markets for them are Latin America, the Middle East and some other Asian markets. (Seiko 5 watches, introduced in 1963, were the first Seiko models the U.S. market had seen; GIs brought them home after serving in the Vietnam War.)

SII also makes some higher-end specialized Seiko-brand quartz models such as the perpetual calendar.

The company has about 11,000 employees. Despite its broad diversification, watches remain a major source of revenue for SII, accounting for about 15 percent of consolidated sales. For the latest fiscal year, SII's consolidated net sales were 199.5 billion yen, or about \$2.2 billion.

SEIKO EPSON, headquartered in Suwa, makes most of the standard quartz, Seiko-brand watches (production of these watches has been transferred from SII to Seiko Epson during the past decade). Seiko Epson also makes the company's radio-controlled, solar-powered models. In addition, it makes motion-powered quartz models, sold under the name "Kinetic," and Spring Drive watches.

In another structural shift in its watch business, Seiko Epson in 2008 completed its acquisition of Japan's Orient Watch Co., in which it had previously held a majority interest. Orient gives Seiko Epson the capacity to make mechanical watches, a category it had abandoned as quartz watches came to dominate the market.

Watches are a much smaller portion of Seiko Epson's business than they are of SII's, accounting for only about 5 percent of the company's annual sales of 1.12 trillion yen, or roughly \$12.6 billion. Seiko Epson employs some 78,000 people.

Both SII and Seiko Epson make watches for the group's Pulsar, Lorus and Alba brands. They also make quartz movements for companies outside the Seiko Group. Together, the two companies make more than 300 million quartz movements per year for third parties. These movements are sold by a Seiko affiliate called Time Module, based in Hong Kong. Time Module was set up in 1987 with funds provided by Seiko Epson, SII and Hattori Seiko (now Seiko Holdings).

Seiko Epson and SII sell all their finished watches, about 12 million in 2008, to Seiko Watch Corp., which markets the watches through subsidiaries all over the world. The U.S. subsidiary, Seiko Corp of America, is based in Mahwah, N.J. Seiko Watch Corp. also handles all watch marketing: advertising, publicity, sports sponsorships, etc. Before Seiko Holdings bought SII, Seiko Watch Corp. was Seiko Holdings' biggest subsidiary, with sales of 93.5 billion yen, or just over \$1 billion.

It's quite simple, really.

Orient Watch Co. is a subsidiary of Seiko Epson



Mechanical-movement assembly at the Shibuku-ishi Watch Studio, a unit of Morioka Seiko Instruments





Museum

Mega

The Movado Sports Edition (SE) Extreme takes the classic Museum Watch design to a sporty new level.

BY GWENDOLYN BENDA

PHOTOS BY ZUCKERFABRIK FOTODESIGN

On the one hand, the Movado SE Extreme is an imposing presence, with an overall diameter of 44.5 mm, a height of almost 11 mm, and an impressively robust bracelet. On the other, its surface finishes and dial design lend it a degree of quiet elegance.

Examine this watch closely and you'll discover a cleanly executed, elaborate finish. Alternating matte and polished surfaces and varying beveled edges enhance the rounded lines of the stainless steel case. In contrast to the scratch-resistant, nonreflective sapphire crystal above the dial, the bracelet and case offer virtually no resistance to scratches whatsoever. The crown guard is remarkable for its sporty shape, but may become uncomfortable on the wrist after a while.

Four round, polished inserts match the round dial marker set at 12 o'clock. Taken together, the four dots form a square, creating a bridge between the angles of the crown guard, lugs and bracelet and the round shapes of the dial and bezel.

The flat dot at 12 o'clock (also in polished stainless steel) dominates the dial, and is the sole reference point for reading the time. The single marker and the wide, steel bar hands stand in stark contrast to the black background. It's amazing how quickly you become accustomed to reading the time on the minimalist dial. Of course, it's not well suited for more precise time measurements, such as for sporting events, but then, neither is any other two-handed watch. And although the dial is not legible in the dark, adding luminous material would have detracted from the overall design of the watch.

THE DIAL, as many watch aficionados know, was designed in 1947 by Nathan George Horwitt, and it was not really not a dial at all, at least according to critics at the time, who felt that two hands and a single marker were insufficient to display time. The iconic round marker at 12 o'clock symbolizes the sun as the focus of our time measurement system. "For us, time is not a sequence of numbers; rather, it is the result of the position of the sun in

star

Movado SE Extreme

relation to the rotation of the Earth,” was how Horwitt explained his philosophy.

A New Yorker born in Russia, Horwitt (1898-1990) was an industrial designer. His style was oriented on functionality and was rooted in the Bauhaus movement in Germany in the 1920s and early 1930s. Horwitt made the connection of functionality and aesthetics his artistic goal. His quote, “Without utility, no beauty — without beauty, what is the use?” rose from the artistic debate between the German leader of the Bauhaus movement, Mies van der Rohe, and the American architect Frank Lloyd Wright. Wright’s well-known aphorism, “Less is more,” caused van der Rohe to counter with, “But nothing is not enough.” And although Horwitt’s dial is certainly “less” than the usual, the dial is clearly not “nothing.” The eye needs the dot as an orientation point, but nothing more.

Horwitt could not find anyone interested in the design for almost 15 years, even though he enjoyed a great deal of acclaim. In 1960 the Museum of Modern Art in New York included the prototype of the watch in its collection, which is how the “Museum Watch” came by its name. Shortly after, Horwitt sold the rights to the design to Switzerland’s Movado. Movado, however, restricted the Museum watch to the United States. In 1983, America’s Gedalio (“Gerry”) Grinberg acquired the Movado company, made the Museum watch the flagship of the brand, and turned it into one of the most successful and iconic designs in the watch world.

From the beginning, the Movado watch brand was remarkable for its design sensibility. In 1881, Achille Ditesheim, a native of Alsace, opened a small workshop in the Swiss watch hub of La Chaux-de-Fonds for the assembly and finishing of pocket watch movements. This family-run business grew rapidly, winning chronometer competitions and surprising its audience with unusual models like the Ermeto. Movado, as the brand was known after 1911, survived takeovers by several larger companies, as well as the quartz crisis. Much of its success can be attributed to the popularity of the Museum Watch. Today, the

SPECS

MOVADO SE EXTREME

Manufacturer: MGI Luxury Group SA, Division Movado, Bienne, Switzerland

Reference number: 606290

Functions: Hours, minutes

Movement: ETA 2824-2, automatic; 28,800 vph; 25 jewels; Incabloc shock absorption; Glucydur balance; Nivarox hairspring; 39-hour power reserve; Etachron fine regulation; diameter = 25.6 mm; height = 4.6 mm; blued screws; satin and sunburst finishing; skeletonized rotor

Bracelet and clasp: Stainless-steel bracelet with double-folding clasp

Case: Stainless steel, sapphire crystal in front and back; water-resistant to 30 m

Dimensions: Diameter = 44.5 mm; height = 10.4 mm; weight = 193 g

Price: \$1,995

New geometric patterns form as the position of the hands changes in relation to the dot at 12 o'clock



brand is the flagship of the Movado Group Inc., which is headquartered in Paramus, New Jersey.

THE SE EXTREME has hands that are wider than those on the standard Museum Watch and includes a red imprint on the dial. This new, more dynamic interpretation of the historic design also resulted in changes to the case. The bezel of the SE Extreme is considerably wider than that of the standard Museum Watch. The inlay work almost seems to mimic the tracks found on rotating bezels of sport watches. Its stainless-steel surfaces give the watch a dashing style and set it apart from the more delicate look of the Museum Watch.

Is the Movado SE Extreme a worthy successor to the original Museum Watch? The name itself hints at a conscious move to distance it from the standard model in favor of more sporty design features. And yet, the design strikes a harmonious balance between the two extremes of classic and modern aesthetic styles. Both influences are apparent, and neither one overshadows the other.

The movement inside the SE Extreme, an ETA 2824-2, is showcased through a screwed sapphire caseback. Compared with the bezel, the steel border on the caseback appears quite wide, with enough space for engraved information about the watch. The good construction and fine finishing on the ETA 2824-2 are well known among aficionados of mechanical watches. The lack of a date display on the dial may bother some wearers, but should not be missed by most.

Unfortunately, the Movado SE Extreme needs improvement in its regulation: on the timing machine it showed an average rate that runs into the positive range of 18 seconds per day. It was impossible to measure the rate results to the second when wearing the watch, but we did observe it running about two minutes ahead per week, which was confirmed by

The screws on the lugs and bracelet reinforce the “dot” theme of the dial and bezel.

**IT TOOK HORWITT 13 YEARS
TO FIND A WATCH COMPANY TO
BUY HIS NOW-FAMOUS DESIGN.**



The SE Extreme shows its colorful side through the sapphire caseback. The skeletonized rotor is a Movado addition, while the rest of the movement is from ETA.



CLOSE-UP

Movado SE Extreme

the timing machine report. Within this deviation, however, our test watch remained quite constant in the different positions.

The bracelet mirrors the case in its material, execution and finishes. The screwed connections between the links allow the bracelet to be nicely flexible and also to fit securely on the wrist. Thanks to this construction, the heaviness of this model (weighing in at 193 grams) is less noticeable on the wrist than you'd expect. The screws are a disadvantage only when adjusting the bracelet, because the connections are tight, requiring extra effort even from an expert watch repairer.

The clasp is hidden beneath the bracelet, its position marked by an end link bearing a Movado logo and a pair of slightly extended buttons that release the folding mechanism. The alternating surface design of the case and bracelet are continued here. The narrow clasp can pinch, however, when putting on the watch.

The Movado SE Extreme is a gentle giant, one that is much less daunting up close. The varying surface finishes and design, the high degree of comfort and the fascinating simplicity of the dial combine to create a very satisfying modern version of this watch icon. ○



The flexibility and close fit of the bracelet make the watch's heaviness less noticeable.

*THE DOT AT 12 O'CLOCK ON THE
MUSEUM DIAL REPRESENTS
NATURE'S TIMEKEEPER, THE SUN.*



The dot at 12 o'clock and bar hands, both in steel, provide a contrast to the stark, black background of the dial.



A close-up, low-angle shot of a watch movement, focusing on a large, black, textured plate. The plate has a grid-like pattern and is set against a bright, blue sky background. The watch's metal case is visible on the left side.

New-Plate Special

*We test
Mühle's Germanika I,
the first chronograph
to incorporate the
German brand's
own plate into its
movement.*

BY ALEXANDER KRUPP

The “off-the-rack” folding clasp does not match the high quality of the crocodile-skin strap.

M

ühle’s Germanika I, which debuted in 2008, is a neatly designed chronograph. At first glance, it appears to be emphatically classical, free of superfluous details and unusual features. But closer examination reveals certain attributes that testify not only to this watch’s individuality, but to its elaborate craftsmanship. For example, despite its typical Valjoux-7750-style arrangement and its simple color scheme of matte black and white, the dial has some appealing details: the high, applied hour-indices are polished and the square five-minute markers bear circular luminous dots. The hour hand is clearly distinguishable from the others, but it’s a bit too broad and doesn’t quite match the other, narrower hands.

The lengths of the hands are well chosen, making it easy to read both the time of day and the elapsed time on the chronograph. The pure white luminous material on the hands gleams with a bluish hue in the dark, rather than with the more conventional pale green found on most watches. As with several other Mühle watches, the date display has been shifted downward from its usual position at 3 o’clock but the repositioning is less disturbing than one would expect because the window and the number are oriented vertically rather than diagonally, and the indicator is quite unobtrusive because of its small size.

The case continues the same high standards of quality and distinctive idiosyncrasy. Many other brands strive for

SPECS

MÜHLE GERMANIKA I

Manufacturer: Mühle Glashütte GmbH, D-01768 Glashütte

Reference number: M1-38-03-200-LB

Functions: Hours, minutes, small seconds; chronograph with counters for 30 elapsed minutes and 12 elapsed hours; date display; stop-seconds function

Movement: ETA Valjoux 7750 “Elaboré,” automatic, chronograph; 28,800 vph; 25 jewels; Incabloc shock absorption; Mühle’s own plate, automatic bridge and woodpecker’s-neck fine adjustment mechanism; 48-hour power reserve; diameter = 30 mm; height = 7.9 mm

Case: Stainless steel with domed, non-reflective sapphire crystal; fully threaded back with pane of sapphire; water-resistant to 10 ATM

Strap and clasp: Crocodile-skin strap with safety folding clasp of stainless steel

Rate results:

(Deviations in seconds per 24 hours)

Without/with chronograph switched on:

Dial up	+16	+14
Dial down	+12	+13
Crown up	+13	+11
Crown down	+8	12
Crown left	+13	18
Crown right	+9	12
Greatest deviation of rate: 8		7
Average deviation:	+11.8	+13.3
Mean amplitude:		
Flat positions	295°	276°
Hanging positions	269°	244°

Dimensions: Diameter = 42.4 mm, height = 15.6 mm; weight = 126 g

Variations: With silver-colored dial; with stainless-steel bracelet (\$3,699)

Price: \$3,599

Pros

- + High-quality case
- + Elaborately modified movement
- + Good legibility

Cons

- Sharp edges on the clasp
- Drastic rate gains

slim, elegant forms, but the appeal of the Germanika I is its bulky case with a narrow flat bezel and a tall middle piece. The former holds a domed, nonreflective sapphire crystal; the latter provides a home for an easy-to-grip crown, user-friendly shaped push-pieces, and screwed strap lugs. The caseback boasts an inwardly domed sapphire crystal that improves the wearing comfort. However, the case is still somewhat top-heavy because of its stately height of 15.6 millimeters.

The well-upholstered crocodile-skin strap is comfortably supple. It has a neatly machine-sewn seam, fully rembordered edges and an affixed second loop. Only the somewhat sharp-edged, off-the-rack folding clasp detracts from the wearing comfort.

THE GERMANIKA I'S signature characteristic is hidden beneath the automatic subassembly and under the chronograph mechanism: Mühle's three-quarters plate, introduced in 2008. In the company's quest for new ways to upgrade its watch movements, master watchmaker Pierre Heinrich and his team added the new plate to the Swiss chronograph caliber Valjoux 7750 that Mühle ordinarily uses. It joins the familiar woodpecker's-neck fine adjustment mechanism with uniquely shaped counter spring, the rotor that Mühle manufactures in-house and the brand's own automatic bridge. The new plate provides three distinct functional advantages:

1. Improved vertical play of the crown wheel, which transfers the winding energy from the crown to the barrel, minimizing friction between the wheel and the plate.

2. A so-called "Glashütte ratchet" to prevent the locking wheel (positioned atop the barrel) from turning backward during winding. The special shapes of the locking spring and pawl facilitate smoother winding than conventional ratchets and reduce the pressure on the locking wheel, thus reducing wear.

3. A removable escape-wheel bridge speeds the process of dismounting the escape wheel. This allows a watchmaker to easily remove the entire escapement, which makes servicing easier.

The new bearing for the crown wheel is not visible through the pane of sapphire crystal in the back, but with a bit of effort an observer can see the Glashütte ratchet along the rim of the movement. If Mühle had chosen a narrower frame for the glass in the back, the outer parts of the movement would have been completely visible.

On the other hand, nothing obstructs the view of the removable escape-wheel bridge. It consists of a small, round, double-screwed plate with a jewel positioned in the middle. Its three colors make this not only a functional sub-assembly, but also a visually appealing highlight. The bridge, which was designed by Mühle's engineers, as well as the pawl and the locking spring, are made by local suppliers; the fine manual processing and the task of fitting the movement are performed by Mühle's own watchmakers. Other parts, including the plate, the automatic bridge, the balance cock and the rotor, are produced entirely on the premises.

The technical changes didn't increase the height of the Valjoux 7750: its original thickness of 7.9 mm remains unchanged. The new plate doesn't quiet the typically loud no-load running of the unidirectionally winding rotor, which sometimes causes the case to vibrate.

The technical modifications are significant, but the embellishments are unfortunately less eye-catching than on other Mühle chronographs. The Germanika I uses the same distinctively shaped rotor with engraved patterns, milling and riv-

Compared to the Valjoux plate, pictured below it, Mühle's plate has an improved bearing for the crown wheel (the round milled indentation at the upper right), a Glashütte ratchet (the spring and pawl at the upper left) and a removable escape-wheel bridge (round plate at lower left)



The burly case contributes to the rugged good looks of the Germanika I



SCORES

MÜHLE GERMANIKA I

Strap and clasp (max. 10 points): The fully rembordered crocodile-skin strap is well crafted and has a second loop; the safety folding clasp is off-the-rack merchandise. **8**

Operation: (5) The crown is easy to grip, but the button on our test watch didn't click neatly into place and it wiggled in its extracted position. The shaped push-pieces have good pressure points. **3**

Case: (10) The elaborate, robust case has a domed crystal above the dial, an inwardly domed crystal in the back, and screwed strap lugs. **9**

Design: (15) The dial is sleekly simple, elegant, and very well balanced, with the sole exception of the hour hand, which is a tad too wide. The case has a distinct shape and artfully alternating processing on the surfaces. **13**

Legibility: (5) All hands are precisely the correct lengths and the time is legible at night. The date display has been kept small, in keeping with the aesthetics of the design, but the smallness isn't a problem. **5**

Wearing comfort: (10) The case has softly rounded forms, but it's somewhat top-heavy. The clasp pinches the skin on the inside of the wrist. **7**

Movement: (20) Mühle significantly upgraded the base movement; the adornments are appealing, but they're less eye-catching than the embellishments on other Mühle models. **14**

Rate results: (10) The daily gain is very large, but the differences among the positions are somewhat smaller. **6**

Overall value: (15) The high-quality case, the modifications to the movement, and the sophisticated design justify the price. The clasp could be more solid and the rate could be more accurate. **12**

TOTAL: 77 POINTS



Mühle has upgraded the Valjoux 7750 by adding a new plate, the brand's own regulating mechanism, automatic bridge and rotor, various decorative engravings and blued screws.

ets, as is used, for example, in the brand's 29er Chronograph, but instead of putting circular graining on the automatic bridge, the plate and the area under the balance, Mühle chose to adorn its surfaces only with very understated patterns. There is circular graining on the balance cock, but it is scarcely noticeable under the woodpecker's-neck fine adjustment mechanism. A welcome addition of color is provided by the many blued screws, which attract attention in both the Germanika I and the 29er Chronograph.

As far as the accuracy of its rate is concerned, the watch we examined showed an average daily gain of 12 seconds (six seconds on the wrist) and a maximum difference of eight seconds among the several positions (both values were determined with the chronograph switched on), which was less precise than expected.

Operating the new watch is easy thanks to the large surfaces of the shaped push-pieces and the screwed crown, which can protrude quite far from the edge of the case. Unfortunately, the crown wiggles a bit in its extracted position and doesn't click as neatly into place as we would have hoped.

All in all, the Germanika I is a solid companion for everyday use, boasting numerous visual and technical refinements and only minor shortcomings. The high quality of the processing combined with the thoroughly modified movement justifies its price of \$3,599. Some good news worth noting: Mühle plans to gradually equip all its chronographs with its new plate, which is, according to managing director Thilo Mühle, an intermediate step along the road toward the development of Mühle's own movement. ○

Capturing the JAWS WATCH

Watch-loving film buffs have long sought the identity of the elusive divers' watch from the 1970s blockbuster. Now the surprising answer can be revealed.

BY GARY AND CHRISTIAN STOCK



The *Shawshank Redemption*. *Die Hard*. *The Godfather*. *Scarface*. *Jaws*. A small group of films that crystallize the American spirit so well they demand a respectful viewing and a fresh six-pack from any American male when encountered while channel surfing. So, two years ago, when a Fourth of July weekend *Jaws* marathon invaded a family Sunday afternoon, attention simply had to be paid.

But on this particular occasion, something else demanded attention as well: during the scene in which shark researcher Matt Hooper (Richard Dreyfuss) readies his poison harpoon, his distinctive divers' watch fills the screen. Two brothers, both vintage-watch buffs, asked a simple question: "What watch is that?"

The answer should have been a mouse click away. The two-second close-up seemingly provided plenty of detail, and the clothes, cars, sunglasses, and, yes, watches worn by movie char-

The movie frame that started the quest: as shark expert Matt Hooper prepares a poison dart, the camera lingers on his distinctive 1970s-style divers' watch.



Top: In his shark suit, Hooper prepares to descend. The fact that he now wears his dive watch over the sleeve of his bulky wetsuit indicated that its bracelet might not be the original. Above: the watch shows up again in Hooper's dinner at the home of Sheriff Brody and his wife.

acters are a much-discussed and well-documented field of Internet chatboard knowledge. Multiple Web sites will give you the exact details of Sean Connery's Rolex from *Doctor No* — a no-crown-guard Submariner 6538 on a croc strap, in case you were wondering — or even Al Pacino's Seiko chronograph from the obscure 1970s racing flick *Bobby Deerfield*.

However, on the subject of Hooper's *Jaws* watch, the Internet for once fell largely silent: a few screen captures and a lot more questions. Some message-board habitués theorized that it was an undocumented Omega, or maybe a Seiko. But most agreed that it was a mystery: in fact, the *Jaws* divers' watch was the best-known unknown timepiece in history.

Until now.

HOW DO YOU FIND a minor prop from a film made under exceptionally chaotic conditions almost four decades ago? We quickly concluded that the most direct resolution to the identity of the *Jaws* watch would be to ask somebody who might have handled it during filming.

COULD IT HAVE BEEN DREYFUSS'S OWN
WATCH, ESPECIALLY CONSIDERING IT WAS
THE 1970s, BEFORE PRODUCT PLACEMENTS
BECAME COMMON IN FILMS?



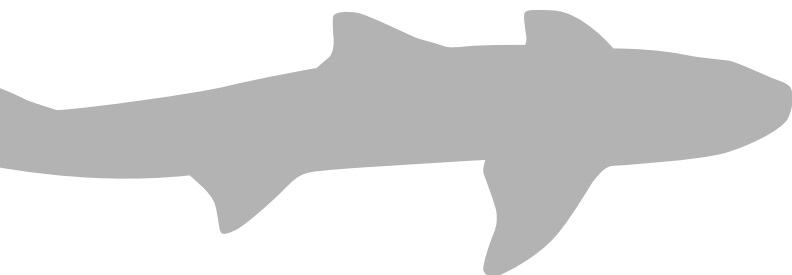
An opening letter to Mr. Dreyfuss produced no response — not surprising, given that other fans have apparently asked the same question, without receiving an answer. After viewing a number of documentaries on the filming and reading the very entertaining *Jaws Diary*, a bestseller in its own right, we concluded that the stunt diver from the scene in which Dreyfuss's character is attacked in the shark cage, Dick Warlock, was probably chronologically the last member of the production to wear the watch. The amiable Mr. Warlock didn't recall any of the details of the watch, however, nor did stunt coordinator Ted Grossman, who managed the stunts filmed on Martha's Vineyard during the movie's marathon 1974 shoot.

Dreyfuss wears the watch consistently throughout the arc of the narrative, from first arrival in the fictional town of Amity to his final, miraculous survival after the sinking of the Orca. Theory: could it have been his personally owned watch, especially considering it was the '70s, before product placements became common in films? Evidence suggested this was not likely, for two reasons. First, the watch was taken from Mr. Dreyfuss and transported across the country to be used in the filming of the terrifying shark-cage attack scenes at the film's climax, which, as it turns out, were filmed (sans live shark) in a pool in California. Second, we unearthed some home-movie footage taken on Martha's Vineyard during the film's production, which showed Dreyfuss lounging by his trailer, wearing a much chunkier sports watch.

Top left: each of the distinctive elements visible in the film appears in the Alsta Nautoscaph — harlequin bezel, sword hands and indices, and cushion case. Left: the beating heart of the *Jaws* watch is a classic Valjoux 2452 automatic movement.



From this angle, the features of the Alsta Nautoscaph snap into clear focus, exactly matching Hooper's watch in *Jaws*.



THOSE MINOR SETBACKS could hardly be expected to deter two watch buffs inspired by a steady diet of “CSI” reruns. The next stop was our own little crime laboratory, in the form of the nearest PC. The two-second shot at the ship’s rail in which Hooper prepares to poison the shark would hopefully provide the clues that would reveal the watch’s identity. Using a laptop, a DVD of the film, and some free software that would probably have cost the CIA millions a few years ago, we enlarged, measured, sharpened and even reversed the watch image, resolving enough detail to map the case and dial, and even to detect movement of the seconds hand.

All of this forensic analysis revealed that the *Jaws* watch had an interesting mix of attributes: Seamaster-style arrowhead dial indices, sword hour and minute hands, an internal date-magnifying lens on the inside of the crystal, and dial markings showing a short logo. Plus the two most distinctive features: an unusual “harlequin” dive bezel, with the arc between 12 o’clock and 3 o’clock reversed in silver, and a very noticeable steel bracelet with portholes.

Based on these clues, in the finest CSI tradition, we created a composite sketch of the *Jaws* watch. Our quarry now had a face; we simply needed to give it a name.

EACH DAY FOR the next year or so, eBay and Google dutifully delivered a couple dozen suspects in the form of search results, and we ran them to earth over morning coffee. Research in the digital age doesn’t wear much shoe leather, but it’s hard on the mouse wrist.

Many vintage divers’ watches featured the arrowhead dial and sword hands — a testament to the pervasive influence of Omega’s styling. But not a single watch had the harlequin bezel and porthole bracelet. Expanding our search to Cooksey Shugart’s *Complete Price Guide to Watches*, 20 years’ worth of Sears catalogs, and even a day at London’s vintage horology shrine, Burlington Arcade, turned up nothing that matched.

Then a thought: could the bracelet be leading us away from the actual identity of the watch? Screen captures and movie footage showed that the bracelet appeared to fit the watch lugs poorly. Further, we noticed that Dreyfuss wears the watch directly on his wrist in most scenes, yet refastens it to rest on top of his thick wetsuit in the shark-cage scenes, with no visible extension clasp showing. Our conclusion: the steel bracelet had to be expandable. Sure enough, research revealed the exact bracelet as a Speidel TwistOFlex, that icon of old-fogeydom worn by everybody’s grandfather. Amazingly, you can still buy a TwistOFlex Mach 1, brand new — on eBay, of course, fresh in its dime-store plastic tray, portholes gleaming.

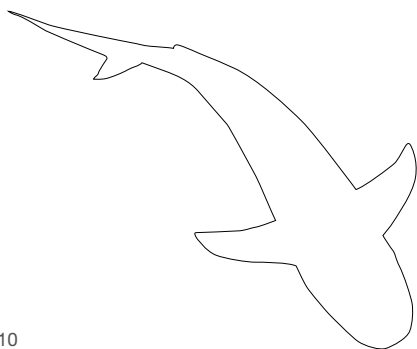
WITHOUT THE MOST distinctive visual element — the oval portholes — to divert us, we began to broaden our search to include watches without regard to their bands.

And then, one day, somewhere around Search No. 3,000, it was simply there, one more eBay listing, for a battered divers’ watch being sold as part of a bedraggled junkshop lot.



Almost 40 years later: the Jaws watch, posed to match the original film frame

ALL THE DETAILS
WERE SUDDENLY
EXACTLY RIGHT —
THE CASE, THE
BEZEL, THE DIAL,
THE HANDS, AND
EVEN THE OVER-
SIZED CROWN.



The experience was a bit like those crime-drama scenes where someone recognizes a killer after viewing a huge archive of mug shots: the bleary-eyed eyewitness tells the detective, “Too many faces; I’ll never remember,” then turns the page and shouts, “That’s him, I’d know him anywhere!” All the details were suddenly exactly right — the case, the bezel, the dial, the hands, and even the oversized crown. The auction title read (drumroll, please), “Alsta Nautoscaph Vintage Diver.” Seven days and \$100 later, the watch arrived by parcel post, a time capsule from the summer that we all avoided going back in the water.

Puzzlement about the brand is entirely understandable: Alsta, though a known name, is in fact obscure enough that it makes other historical 1960s makes like Enicar and Clebar seem world-famous by comparison. For two fairly serious watch buffs, the immediate response was, “No wonder no one can identify the darned thing,” followed quickly by the sense that maybe there was more to the story than simply a no-name timepiece randomly selected by a junior wardrobe assistant.

Examination soon showed that while Alsta was the marking on the dial, the case interior was engraved “Alstater Watch Co.” There is no town of Alstater on any Swiss map — indeed, the word *alstater* translates as “from all cities” or “global” in Swiss German — but U.S. horological brand registration records finally revealed that a trademark for Alsta had been registered in January of 1948 to an address in the crowded, ever-changing jewelry district of Manhattan — hardly a revealing detail.

The term “Nautoscaph” was more illuminating. The word itself is in all likelihood an adept piece of saltwater-flavored marketing. In 1960, a research sub named the Bathyscaph (Greek for “deep ship”), set a not-since-equalled record for descent with an onboard crew: it carried two men to the 35,000-foot depths of the Marianas Trench, the world’s deepest sea floor, and made headlines around the globe. Presumably some canny marketer of the day recognized the associations of the craft’s name, and coined the *Jaws* watch’s model designation to take advantage of it.

Searching for watches using the Nautoscaph brand name yielded both questions and answers. Even though it had never been registered as a brand name, Web searches turned up dive watches marked “Nautoscaph” from former Breitling importer Wakmann, as well as from Solvil et Titus, Emewo, and Andre Bouchard. Varied in styling, they nevertheless all seemed to share the distinctive double-domed caseback and the impressive 999-foot depth rating of the Alsta.

IN THE DAYS AFTER its arrival, our *Jaws* watch gave up a few but not all of its secrets on the workbench. Whatever its provenance, someone had worked hard to construct a rather impressive piece of horology for the time period. The stainless-steel case employs what in the ’60s would have been state-of-the-art features to achieve water-resistance: a wide inner rear gasket that bears directly on the caseback to increase sealing surface area, and an oversize spring-loaded crown with multiple internal water seals, using the same submarine-hatch principle as Rolex and IWC, in which increasing water pressure actually increases the effectiveness of the seal.



Left: Hooper's watch is reborn, using a vintage Alsta Nautoscaph and a Speidel Mach 1 expandable bracelet. Below, left: the story behind the Alstater Watch Company, whose brand name appears on the movement, remains a mystery.



The *Jaws* watch movement is a rather luxe version of the Valjoux 2452, an old design that actually lives on today in the highly regarded, contemporary ETA 2824. A design that makes old-time watchmakers smile in admiration, the 2452 in the *Jaws* watch has the kind of components that you might find today only in watches above \$5,000, including a screw balance and a rhodium-plated ébauche.

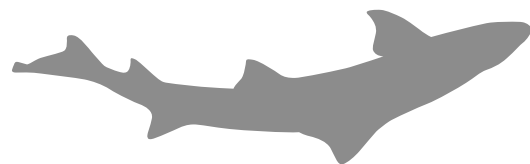
Looking back at skin-diving magazines of the era gave us another perspective: at that time, a divers' watch was a key piece of safety equipment, the only way to prevent decompression sickness. And the choices for an honest-to-goodness divers' watch that could survive more than a dishwashing expedition were few: well-heeled adventurers might choose a Rolex Submariner or Omega Seamaster, their less affluent friends a Seiko 6300-series or possibly a Zodiac Sea Wolf, both at that time sold principally at military PXs. In that era, the Nautoscaph would have been a genuine bargain: a moderately priced divers' watch guaranteed to a depth greater than the Rolex Submariner of the day (300 meters versus the Rolex rating of 200 meters).

In short, all very appropriate for a certain scruffy shark expert from Woods Hole Oceanographic Institute known to invest his considerable family wealth in unpretentious but high-grade marine electronics, cages, and dive gear. In 1974, an Alsta Nautoscaph would have been a very plausible choice to place on Dr. Matt Hooper's wrist.

THOUGH NOT LIKELY the actual watch worn by Dreyfuss, the *Jaws* watch has been identified and captured in archetype. Now mated with the correct period porthole bracelet, it looks exactly like the timepiece worn during the harried Martha's Vineyard filming. But there are certainly other mysteries beckoning to intrepid watch buffs. No one seems to know what company actually designed and manufactured the innovative *Jaws* watch, sold it under many names, then allowed it to lapse into obscurity. Did the little known Alstater Watch Company actually engineer the impressive Nautoscaph? Did another factory develop the entire design and sell it as a private-label piece to any wholesaler ready to order 50 of them?

But those are hunts for another day. Tonight, they're running *The Shawshank Redemption* on TV, commercial-free. And attention must be paid. ○

Gary and Christian Stock are brother watch aficionados who also share a background in computer science and film lore. Technical analysis and watch photography are by Stephen Hammersley, www.villagewatchmaker.com.



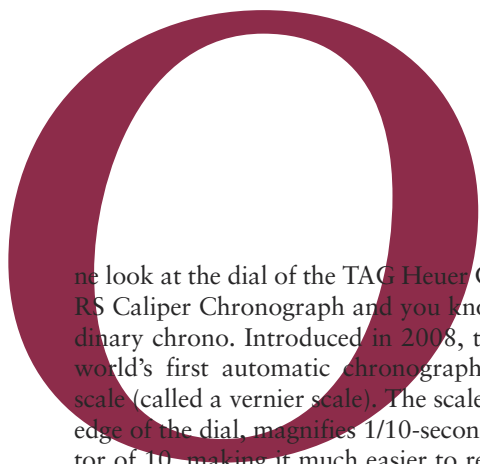
A close-up, artistic photograph of a watch movement, specifically the slide rule mechanism of a chronograph. The slide rule is a prominent red component with a black and white checkered pattern on its edge. The background is a deep, dark red, creating a rich, monochromatic aesthetic. The lighting highlights the metallic textures and the precision of the mechanical parts.

SLIDE RULE FOR THE WRIST

BY ALEXANDER KRUPP
PHOTOS BY NIK SCHÖLZEL

*The TAG Heuer Grand Carrera Calibre 36 RS
Caliper Chronograph measures time to 1/10 of a
second — and then magnifies it.*





ne look at the dial of the TAG Heuer Grand Carrera Calibre 36 RS Caliper Chronograph and you know right away it is no ordinary chrono. Introduced in 2008, the Caliper Chrono is the world's first automatic chronograph with a rotating caliper scale (called a vernier scale). The scale, which slides around the edge of the dial, magnifies 1/10-second measurements by a factor of 10, making it much easier to read fractions of a second. Another peculiarity of the watch is that it uses disk displays to show the elapsed hours at 6 o'clock and elapsed minutes at 3 o'clock. Then there's the linear small seconds indication at 9 o'clock. And how about that decorated steel bridge sitting smack dab in the middle of the dial?

It's the caliper scale that gives the watch its greatest distinction (and its name). Vernier scales are familiar to most people from slide rules. They are used to measure fractions of a given unit. For example: to read 1/10 millimeter, the user checks which graduation corresponds exactly or most closely with a millimeter mark. (The last photo of this article provides an example: the vernier scale begins directly after the 11 millimeter line, and its "1" index is precisely aligned with a millimeter mark. The caliper therefore shows 11.1 millimeters.)

TAG Heuer has adapted this device to measure time intervals instead of lengths. On a wristwatch, the linear track of a caliper rule is circular so that it can interact with the central chrono-seconds hand. Here's how the scale works: After stopping the chronograph, the wearer uses the red-striped crown at 10 o'clock to turn the caliper scale along the edge of the dial until the red triangle at the zero point on the scale lines up precisely with the red tip of the chrono-seconds hand. On the photo on the previous page, the chrono-seconds hand has stopped between 37 and 38. You use the caliper scale to get the one-tenth-of-a-second measurement. Here's how: the caliper scale lies flush with the watch's 60-minute track. Examine the markers on the caliper scale to see which marker lines up most exactly with a marker on the 60-minute scale. In the photo, you can see that the only marker on the caliper scale that lines up precisely with a line on the 60-second scale is the 4, indicating 4/10ths of a second. So the chronograph hand reads 37.4 seconds.

THE ONLY FREQUENCY that makes measurement of a tenth of a second possible is five Hertz, or 10 vibrations per second. TAG Heuer did not have to search very long to find a reliable movement with this frequency. Its sister brand in the LVMH Group, Zenith, makes the most famous one, the El Primero chronograph movement. Its advantages include a powerful eccentric fine regulator with a long regulator pointer and a Glucydur balance that is resistant to temperature fluctuations. The El

*THE WATCH'S UNUSUAL
FEATURES INCLUDE ITS
VERNIER SCALE, LINEAR
SECONDS DISPLAY AND
ROTATING DISK COUNTERS.*



Pros

- + Attractive, technical design
- + Exciting movement
- + Top quality case

Cons

- Poor legibility
- Second crown is difficult to use

SPECS

TAG HEUER GRAND CARRERA CALIBRE 36 RS CALIPER CHRONOGRAPH

Manufacturer: TAG Heuer SA,
Rue L.-J.-Chevrolet 6a, CH-2300 La Chaux-
de-Fonds, Switzerland

Reference number: CAV5115.FT6019

Functions: Hour, minute, linear small
seconds; chronograph with 30-minute
and 12-hour counters; date

Movement: Calibre 36 RS COSC, derived
from the Zenith El Primero 400, automat-
ic; COSC-certified chronometer; chrono-
graph; 36,000 vph; 31 jewels; eccentric
fine regulation; Glucydur balance; Kif
shock absorption; 50-hour power reserve;
diameter = 30 mm

Case: Stainless steel with curved, double-
sided nonreflective crystal; sapphire case-
back with crossbar and six screws; water-
resistant to 100 meters

Strap and clasp: Rubber strap with stain-
less-steel folding clasp

Rate results:

(Deviation in seconds per day):

Chronograph off/on

Dial up	+3	+1
Dial down	+3	+2
Crown up	+3	+1
Crown down	0	-1
Crown left	-1	0
Crown right	+6	+4
Greatest rate deviation:	7	5
Average deviation:	+2.3	+1.2
Average amplitude:		
Horizontal positions	285°	263°
Vertical positions	274°	243°

Dimensions: Diameter = 43 mm,
height = 14.5 mm, weight = 140 g

Variations: With steel bracelet (\$7,900);
with black PVD-coated titanium case and
rubber strap (\$8,900) or alligator strap
(\$8,900)

Price: \$7,900

Primero's only technical drawback is that it lacks a hack mech-
anism, which makes it impossible to precisely set the time.

Onto the reliable El Primero base caliber TAG Heuer adds
its own in-house disk displays for elapsed minutes and hours
and running seconds. The engraved, skeletonized rotor with
Geneva stripes as well as the "C36" engraving are also TAG
Heuer additions. Other visual treats — like exposed wheels,
blued screws, line finishes and polished and beveled edges — be-
long to the Zenith base movement.

After adding modifications to the base caliber, TAG desig-
nates the movement as Calibre 36 RS (the "RS" refers to the
disks, or "rotating systems," for the chronograph minutes and
hours). All Caliper Chronograph movements are certified
chronometers, tested for accuracy by the Swiss testing agency
COSC. It's worth noting that the only position not tested by
COSC (the rarely occurring position "crown right") showed
results that jumped far into the positive range in our test. This
increased the maximum deviation to seven seconds. As a result,
the Grand Carrera Calibre 36 RS Caliper Chronograph re-



*The chronograph pushers are fluted;
the oversized crown features the
TAG Heuer logo.*



ceived just eight of 10 points for rate results in our test scores, despite having met the standards for a chronometer. The average rate is low, at +2.3 seconds per day, and improves still further to +1.2 seconds per day when the chronograph is engaged, with amplitudes remaining stable. The fact that the chronograph disks have a compensating effect on the rate is proven by the low deviation of five rather than seven seconds per day when the chronograph is on. The watch is regulated so precisely that it hardly shows any minus values in any of the positions, while still consistently running ahead slightly. If you're trying to catch a train, you're more likely to arrive a bit too early than too late.

THIS GRAND CARRERA'S stainless-steel case is excellently finished. The case frame, bezel (with an engraved tachymeter track) and screw-down sapphire caseback have both polished and brushed surfaces. The two fluted crowns with the TAG Heuer logo and the ridged chronograph pushers with black highlights complete the overall high-quality appearance of the case. The top sapphire crystal is curved and nonreflective on both sides, while the sapphire caseback is divided by a steel bar. This is an attractive design feature but it should be reserved for watches with less interesting movements. The case is held in place by six screws and is water-resistant to 100 meters.

The multi-layered dial is just as nicely finished as the case, with deep ridges, applied markers, a deep date window and the attractive bonus of two steel bridges with beveled and polished

SCORES

TAG HEUER GRAND CARRERA CALIBRE 36 RS CALIPER CHRONOGRAPH

Strap and clasp (max. 10 points): The high-quality strap is quite thin but well made. Stainless steel bars on the strap ends and simple but sturdy safety folding clasp with adjustable strap add style. **8**

Operation (5): Ridged chronograph pushers and fluted crown increase comfort but the additional crown is difficult to reach. The movement does not have a hack mechanism. **3**

Case (10): The case is water-resistant to 100 meters, rich in details and very well finished. Its single fault: the edge between the lugs and the steel strap ends collects dust. **9**

Design (15): The dynamic technical sport watch design is attractive and balanced. Only the illogical placement of the minute counter marker is distracting. **14**

Legibility (5): Ease of reading the standard hour and minutes is average, but the elapsed time is more difficult to read. Plus, the linear small seconds has no detail track. **2**

Wearing comfort (10): The thin rubber strap is not an adequate counterweight to the very heavy case, but wins points for its suppleness and ventilation holes. The clasp has a few sharp edges. **7**

Movement (20): TAG Heuer adds disk displays on top of the reliable, finely decorated, COSC-certified El Primero chronograph caliber from its fellow LVMH brand, Zenith. **17**

Rate results (10): The timing machine recorded mostly good individual rates and an average deviation; the maximum difference between the various positions was somewhat poorer. **8**

Overall value (15): The finishing and the movement justify the high price. **12**

TOTAL: 80 POINTS

TAG Heuer Grand Carrera Calibre 36 RS

edges, and côtes de Genève finishing. The date at 4:30 is recessed because its disk lies beneath the rotating system.

The caliper scale at the edge of the dial consists of three curved steel bars; they provide a balanced effect, even though two of them have no function. This could have been avoided by using a triple vernier scale. Wearers will find that the crown at 10 o'clock is inconveniently placed; a triple vernier scale would have meant turning the crown as little as possible.

The unusual design of the watch unifies sport and technology. Still, there are some features that bear scrutiny. The placement of the red marker on the minute counter, for example, makes no sense. It is crooked, offset from the usual horizontal position by one marker. Also, because they are the same color, the hands are difficult to distinguish from the dial bridges and are highly reflective under strong light. All the hands are somewhat too short and don't reach the corresponding tracks. Plus, the triangle on the vernier scale doesn't reach the seconds hand.

The disk displays for the chronograph minute and hour, while quite unusual, are difficult to read; one problem is that the numerals are quite small. The linear running seconds indicator at 9 o'clock has no detailed track. Instead, a disk with printed graduation marks moves behind a cutout in the dial. For design reasons, the beginning of the track as well as some of the rotating hash marks are red. It looks as if they have something to do with the chronograph function, which also has red indicators, but they do not. The watch's legibility is below average.

Aside from the additional crown being hard to reach and the lack of a hack mechanism, operation is easy — the ridged chronograph pushers work smoothly and the fluted screwed

crown locks cleanly in its positions. The watch feels good on the wrist thanks to the snugly fitting case and the suppleness of the ventilated rubber strap. The imbalance of the heavy case and the very thin strap is a distraction, however, as are the two sharp edges on the inner side of the clasp. Otherwise, the high-quality rubber strap and the carefully constructed simple folding clasp and the adjustable strap adjustment leave nothing to be desired. The strap has rounded edges to make it simpler to thread into the elegant clasp. The closure itself is constructed of a solid piece of stainless steel and bears a relief of the brand logo. It closes reliably. The solid stainless steel elements with engraved TAG Heuer name, attached to the ends of the strap with two large-headed screws, are a visual bonus. This creates a virtually seamless connection with the case even though the strap is fastened with conventional spring bars. It's only unfortunate that the rounded edges of the steel strap ends do not follow the curvature of the lugs as this creates an edge that collects dust.

What is true for the strap is true for the rest of the watch. The Grand Carrera Calibre 36 RS Caliper Chronograph is complex in both its design and finishes, though some details need improvement. The \$7,900 price is justified by the high quality of all its components, not to mention the beautiful and precise movement within. In fact, Zenith watches with the El Primero caliber cost significantly more.

Anyone who can live without a hack mechanism, and is prepared to put a bit more effort into reading the time, will find unlimited pleasure with this striking sports watch and its exciting additional functions. ○



The clasp can be adjusted to any length along the rubber strap.

PLAYING THE BIG NUMBERS

BY JENS KOCH

We test A. Lange & Söhne's mechanical digital watch, the Zeitwerk, which combines a groundbreaking design concept with classic Lange features.





Pros

- + Ingenious design
- + Innovative movement technology
- + Value for the price

Cons

- Visible difference in height between first and second minute digits
- Minute disk moves slightly before jumping to the next minute

TEST

A. Lange & Söhne Zeitwerk



motions are sure to run high among fans of A. Lange & Söhne watches when the new Lange Zeitwerk appears in jewelers' display windows this year. Some will love the offbeat design concept, while others may dismiss it as straying too far from the "classic" features they expect. Many will compare it to the Lange 1, a watch that became the German manufacturer's most recognizable and successful model thanks to its unconventional, offset display. The Zeitwerk is expected to achieve similar notoriety, with its new design concept that may very well influence the style of Lange models in the future.

The watch cuts a striking figure. Its most dramatic feature is the winged German silver time bridge that extends over the dial to frame the digital hour and minutes displays as well as the small seconds subdial, effectively unifying all these elements. Besides its aesthetic appeal, this bridge is also a functional part of the movement: it holds the arbor for the two minute disks with an unusual colorless jewel and is secured visibly to the mainplate by a screw. In conjunction with the two digital displays this creates a harmoniously balanced image. The Zeitwerk is immediately recognizable as a Lange product, with its "auf" (up) and "ab" (down) indications on the power display and unique shape of the hands. The shape of the case reflects typical Lange styling, and even the digital displays have a familiar look: they use the same type of numerals as do the large date indications on many other Lange watches. Lange dispensed with the usual bar between the

first and second digits of the display (shown with two disks), which is an appealing aesthetic touch.

HISTORICALLY SPEAKING, the Zeitwerk is preceded by the Dresden Semperoper five-minute watch, built by J.C. Friedrich Gutkaes (Ferdinand A. Lange's teacher and later father-in-law) in 1841. In that watch, the hours appear as Roman numerals in the first window while the second window, showing the minutes, advances only every five minutes (i.e., the numerals 00 are followed by 05, then 10, and so on).

The minute indication on the Zeitwerk is much more precise and involves a shift every minute. This "jumping" minute indication has presented a massive challenge for other watch companies that have attempted it. Harry Winston, for example, did not get its Opus 3 to work until six years after its introduction, and the Porsche Design Indicator, with digital display of chronograph hours and minutes, had to be redesigned after its debut.

The problem is the enormous force required to move the disks. While the date disk advances only once per day, the three disks needed for displaying the hour and the two digits for the minutes require a total of 1,608 advances per day. The strong spring that is needed for this is the reason

The caliber developed for the Zeitwerk, with its skeletonized bridge for the constant-force escapement and numerous decorative finishes, is a feast for the eye.

Photo by Marcus Krüger





*A CONSTANT-FORCE ESCAPEMENT
ENSURES CONSISTENT RATES AND
ADVANCES THE MINUTE DISK. LANGE
PRODUCES ITS OWN ESCAPEMENT
SPRING AND HAIRSPRING.*

for a significant difference in power between the watch's fully wound and nearly unwound state. In fact, an even stronger spring would be needed in order to utilize only the relatively constant mid-range torque. And while A. Lange & Söhne has experience with strong springs, as in the Lange 31 with its entire month of power reserve, the spring in the Zeitwerk had to be even stronger than that.

LANGE CREATED AND PATENTED an innovative barrel with the goal of keeping the watch's dimensions relatively small. This design reverses the conventional principle of winding up and winding down. The high-friction bearing for the spring barrel is used for winding the movement; this ensures that the barrel wheel can turn in a minimized friction bearing as the watch winds down, leaving more energy in the mainspring for powering the disk mechanism.

Since too much power can damage the mechanical components, a tiny governor within the Lange Zeitwerk turns exactly 525,600 times per year. The outer minute disk advances by one step while a fly vane decelerates it. This component — shaped like a tiny revolving door — creates air resistance to slow the movement but still allows the disk to advance within a fraction of a second each minute.

Lange used the ingenious constant-force mechanism to solve the problem of decreasing rate precision due to energy required for advancing the disks. This refined yet complicated technology was used in a slightly different way in the Lange 31. It ensures that a constant amount of torque is delivered to the balance wheel independent of the state of the mainspring. Lange produces its own hairsprings in addition to the spring for the constant-force escapement, bringing the number of components in the Zeitwerk to an impressive 388.

Close examination of the constant-force escapement reveals that its pallet must hold back the entire torque of the powerful barrel alone, so it is essential that the pallet stone be fastened securely. There were no problems with the company's own test watches (which were set to run at 12 times normal speed, the equivalent of 10 years of operation, while also being subjected to extreme impact tests). However, our test watch contained one of the first production movements and stopped advancing correctly after only a short time because a pallet stone had shifted out of place. Afterward, Lange replaced the shellac it had been using with a strong adhesive in all completed watches. In addition, the company redesigned the column wheel to be sturdier and more re-

SPECS

A. LANGE & SÖHNE ZEITWERK

Manufacturer: Lange Uhren GmbH,
Altenberger Strasse 15, 01768 Glashütte,
Germany

Reference number: 140.029

Functions: Jumping hours and minutes
(digital), small seconds, power reserve
indication

Movement: L043.1, manual-winding;
18,000 vph; 68 jewels; Incabloc shock ab-
sorption; Glucydur balance; eccentric fine
regulation; swan neck fine regulation for
the beat; in-house hairspring; constant-
force escapement with in-house spring,
hand-engraved balance bridge and es-
cape wheel bridge; diameter = 33.6 mm;
height = 9.3 mm; 36-hour power reserve

Case: White gold, sapphire crystal in front
and back, caseback held by six screws,
water-resistant to 30 meters

Strap and clasp: Hand-stitched crocodile
strap with white-gold pronged clasp

Rate results:

(deviations in seconds per 24 hours)

Dial up	+3
Dial down	+4
Crown up	0
Crown down	+1
Crown left	0
Crown right	+1
Greatest deviation:	4
Average deviation:	+1.5
Average amplitude:	
Horizontal positions	292°
Vertical positions	255°

Dimensions: Diameter = 41.9 mm,
height = 12.6 mm, weight = 141 g

Variations: Rose or yellow gold; platinum
(\$75,900)

Price: \$54,500

liable. After this repair, our test watch ran perfectly for the entire duration of the three-week test.

THE SAPPHIRE CRYSTAL caseback provides an excellent view of the large movement, which is truly a work of art: Every part exhibits hand-executed finishes and brilliant gold-finished engraving; details like the screwed gold chatons and hand-engraved balance and pallet bridges radiate the highest level of craftsmanship. The three-quarter plate for the escape wheel is decorated with a Glashütte stripe finish, the mainplate with perlage, and visible gears with a Glashütte sunburst finish. The end plate of the escape wheel is high-polished, and the screws are polished and partially blued. The delicate bridge for the constant-force escapement shines with a line finish and two screwed gold chatons. Some (but not all) of the mainplate's edges are beveled and polished. As in the Richard Lange watch, the large balance wheel has eccentric regulating weights instead of regulating screws.

The movement was adjusted as carefully as it was decorated. Measurements on the timing machine showed a minimal positional error of only four seconds. The Zeitwerk ran slightly ahead in all positions, and the average deviation was quite low, at only +1.5 seconds per day. Moreover, even after the watch had been worn under real conditions for three weeks, the watch showed exactly the same results.

It takes some time to become accustomed to reading the disks within the windows; a standard digital display reads much differently. However, while it is much easier to read the approximate time on a standard analog watch dial, reading the exact time is actually easier on this watch thanks to the large numerals in the windows. And if only the right third of the watch is peeking out from under your sleeve, you can still easily read the minutes — a practical feature, since most of us usually know the hour.

The barely audible click that occurs when the minute disks advance sounds like a tiny lock snapping into place, and is only slightly louder than the ticking of the Lange movement. Less pleasing is the warning sound we all know from me-



Photo by Marcus Krüger

SCORES

A. LANGE & SÖHNE ZEITWERK

Strap and clasp (10): The beautifully patterned crocodile strap is carefully hand-stitched, but the attractive and practical buckle closure could have been polished more carefully. **9**

Operation (5): The large crown is easy to pull. A hack mechanism stops the balance, and minutes can be set either forward or backward. **4**

Case (10): The white-gold case is polished with exquisite care. The caseback makes the watch appear flatter than it really is. **9**

Design (15): The digital display features a groundbreaking design that could, like the Lange 1, be a trendsetter without fully breaking from tradition. **15**

Legibility (5): The time can be read quickly and much more accurately than on a watch with hands, though the large numerals remain dark at night. **4**

Wearing comfort (10): Despite a case diameter of almost 42 mm, the watch is comfortable to wear, thanks to the sloping lugs and pronged buckle. **9**

Movement (20): The jumping time indication requires a great deal of maintenance, but the newly developed barrel and constant-force escapement with governor and fly vane provide an excellent solution. The movement is also a feast for the eye, thanks also to Lange's elaborate surface finishes. **19**

Rate results (10): The in-house springs for the balance and constant-force escapement paid off with low positional errors and an excellent average deviation. **9**

Overall value (15): The price of the watch is high but appropriate due to its superior quality and technical innovations. **13**

TOTAL: **91 points**

The movement's remontoir bridge features partially blued screws, screwed gold chatons and a line finish

chanical clocks, which is caused by the minute disk being slightly offset downwards about six seconds before it jumps.

The case, with its satin-finish center section and narrowing lugs, is the picture of reserved elegance. The slightly raised caseback has a concave edge that makes the watch appear flatter than it actually is. Every surface boasts excellent polishing and finishing.

The hand-stitched crocodile strap has fully turned edges and an attractively large pattern. The distinctly shaped pronged buckle might have been more carefully polished on its inner surface, but the clever strap design ensures that the clasp lies snugly against the inner wrist and the strap bends very little. Fortunately, the rather sharp edges of the clasp are not very noticeable when wearing the watch. Despite its large size (almost 42 mm) the Zeitwerk lies comfortably on the wrist. Though the strap is ini-

The numeral disks have a multi-layered design.

tially quite stiff, it did become more supple after a short period of wear; and the crown, though placed very near the bottom edge of the case, does not touch the wrist thanks to its strategic position at half past one o'clock.

The Zeitwerk's price (\$54,500) is high, but worth it. A comparable model, the Lange 31, was introduced in 2007 with a power reserve of one month and a constant-force escapement. It has similar complications and, at \$114,000, costs more than twice as much. If the Zeitwerk had been introduced before the financial crisis, its price would have surely been much higher, so prospective customers might find it to be quite a value for the price. ○



Ladies'

Patek Philippe has launched its new in-house, manual-wind chronograph movement in, of all things, a women's watch.

Trouble

BY NORMA BUCHANAN

It was a good news/bad news kind of thing. In November, Patek Philippe held a press party at its newly refurbished Paris boutique to unveil a new, in-house, manual-wind chronograph movement. Watch fans had long looked forward to it: a new Patek caliber is always big news, and this one, a follow-up to the in-house automatic chronograph Patek Philippe introduced four years ago, was eagerly anticipated.

Trouble is, the new movement, Caliber CH 29-535 PS, is inside a women's watch. For now, men can only ogle, waiting for the day (probably at the upcoming Baselworld fair) when the CH 29-535 PS will be introduced in a men's model.

Why did Patek choose to put its new movement in a diamond-encrusted, opaline dialed, cushion-shaped women's watch (it's called, appropriately, the Ladies First Chronograph) and keep men waiting for their own version?

Novelty is a big reason, says one Patek executive: the ladies-first move is so out-there that it's bound to get tongues

wagging about the new caliber. (The watch's price tag, \$79,800, will also help.)

Plus, says Thierry Stern, president of Patek Philippe, demand is growing for women's complicated pieces. What began in Asian markets a few years ago has now become a global phenomenon. "I heard the whole world saying that it's time for a nice complicated ladies' watch," says Stern.

This is despite the fact that Patek Philippe's most popular women's watch — one of the biggest success stories in the women's-watch category — is the Twenty-4. Ninety percent of Twenty-4 watches sold are quartz-powered. Stern says there will always be a place for quartz in the Patek ladies' lineup because of the design flexibility it offers. But mechanical pieces, including complicated ones, have a bright future, he believes.

His conviction was reinforced by consumers' response to the very thin reference 5959, introduced in 2005. That watch contains in-house Caliber CH R



Patek Philippe Ladies First Chronograph

27-525 PS, the slimmest split-seconds chronograph with column-wheel movement ever made. Its svelte profile appeals to women who eschew chunkier complicated pieces. "When we launched the thin split-seconds 5959 we could see there was demand for such a watch for ladies," Stern says. (Patek produces just a few of these watches each year, so very few people, male or female, have ever worn one.) Patek also got a warm reception for another women's complicated mechanical, the annual calendar model, which, like the 5959, came out in 2005.

The new movement will, over time, replace Caliber CH 27-70, launched in 1986, and for nearly two decades the base for all Patek Philippe chronographs. The CH 27-70 is based on Caliber 2310, made by Manufacture Breguet (the new name of Nouvelle Lémania) exclusively for Patek Philippe, which embellishes and reworks it extensively.

The CH 29-535 PS will be in short supply for some time. Patek Philippe manufactured just a few pieces of the new

movement last year. This year, Patek could produce as many as 500 to 700 movements, but it's too early to know exactly how many, Stern says.

THE MOVEMENT is what many people call a "traditional" or "classic" chronograph, meaning that it has a column wheel and horizontal coupling. It's about 2 mm wider but slightly thinner than the CH 27-70.

The new chrono nonetheless has several unusual features. One is its 30-minute counter (located just below 3 o'clock), a so-called "instantaneous" minute counter. In this type of counter the hand jumps to the next minute exactly at the 60th second rather than moving in a continuous progression, or, as in a so-called "semi-instantaneous counter," starting to move at about the 58th second and jumping at the 60th second. Patek chose this type of counter, which is more difficult to make than the other two, because it is easier to read: there can be no confusion about which minute the hand is pointing to.

The 29.60-mm wide, manual-wind CH 29-535 PS is visible through the watch's sapphire caseback.



Patek Philippe Ladies First Chronograph



SPECS

PATEK PHILIPPE LADIES FIRST CHRONOGRAPH

Manufacturer: Patek Philippe, Chemin du Pont-du-Centenaire 141, CH-1228, Plan-les-Ouates, Switzerland

Reference number: 7071R

Functions: Hours, minutes, running seconds subdial, chronograph with instantaneous 30-minute counter, stop-seconds function

Movement: Caliber CH 29-535 PS, manual-wind, developed and manufactured in-house; column-wheel, horizontal-clutch chronograph; 28,800 vph; diameter = 29.6 mm; height = 5.35 mm; power reserve = 65 hrs. (58 hrs. with chronograph running); 4-spoke Gyromax balance; Breguet balance spring; 33 jewels; Patek Philippe quality seal

Case: Rose gold, sapphire crystal front and back, 136 diamonds (approx. 0.58 ct.) set in dial flange

Strap and clasp: Alligator strap with rose-gold pronged buckle

Dimensions: Diameter = 35 mm x 39 mm, height = 10.95 mm

Variations: Silver-colored opaline or black opaline dial

Price: \$79,800

The movement also has six technical innovations for which Patek Philippe has either applied for, or already been granted, patents:

1. An optimized tooth profile. The shape of the teeth on the chronograph wheel and clutch wheel are such that they mesh more smoothly than on other chronographs, Patek says. Patek first used this shape in the CH R 27-525 split-seconds chronograph. It has three advantages. First, it eliminates the jumping backwards or forwards that sometimes occurs when a chronograph is started. Second, it minimizes quivering of the chronograph seconds hand. Third, it reduces friction, making for less wear and tear and greater efficiency. Because of the shape of the teeth, the chronograph seconds hand can be kept running constantly. Doing so reduces the movement's power reserve to 58 hours. (Being able to use the chronograph seconds hand as a constantly running seconds hand is also a feature of Patek's in-house automatic chronograph movement, introduced in 2006 in reference 5960, but there it's due to the movement's vertical clutch, not the shape of the teeth.)

2. A column-wheel cap that can be used to adjust the degree of penetration between the chronograph wheel and clutch wheel. In other chronographs, this

adjustment is made by means of an eccentric next to the clutch wheel. Patek says its system enables more precise adjustment.

3. Improved synchronization between the clutch lever and blocking lever. (The clutch lever engages and disengages the chronograph wheel from the clutch wheel; the blocking lever blocks the chronograph wheel so that the chronograph hand stops instantly.) In a standard chronograph, this synchronization occurs by means of the column wheel. In the CH 29-535 PS, however, the clutch lever has a special finger that directly synchronizes the clutch lever and blocking lever. Patek says this enables the watchmaker to adjust the control sequences more precisely because he has to deal with just one point rather than two. Furthermore, it diminishes chronograph-hand jumps when the chronograph is started and stopped.

4. A pierced-out minute-counter cam. The cam has a slot in it to prevent abrupt blocking when the wearer resets the chronograph. This reduces hand quiver, Patek says.

5. Self-setting return-to-zero hammers. The hammers that reset the chronograph seconds hand and minutes counter are equipped with a self-setting system that makes it unnecessary to mechanically adjust the minute hammer function. This increases the reliability of the mechanism.

The movement has a column wheel, horizontal clutch and several technical innovations.



6. Hammers pivoted between jewels. The seconds and minutes reset hammers are placed on the same axis between two jeweled bearings. Each hammer has its own spring that presses it against its respective cam. According to Patek, this system “assures that the hammers remain precisely aligned in the vertical direction and improves the smoothness of their rotation.”

The CH 29-535 PS is the first movement Patek has launched since it jettisoned the Geneva Seal in favor of its own, in-house Patek Philippe Seal (see the June 2009 issue of *WatchTime*, p. 22). The new seal is inscribed on the movement’s minute-counter bridge.

Patek will add complications to the movement as the company incorporates it into men’s watches. These will include a perpetual calendar version, a successor to the company’s CH 27-70 Q. ○



The shapes of the teeth on the clutch and chronograph wheels are meant to reduce friction and enable smoother operation of the chronograph.



The CH 29-535 PS has self-setting return-to-zero hammers.





THE GUILLOCHE MACHINE

*From Ralph Lauren, a rare look
at a relic — the rose engine used
to create guilloché patterns on
watch cases and dials.*



On the work table, rejected dials, a loupe, and tools

2



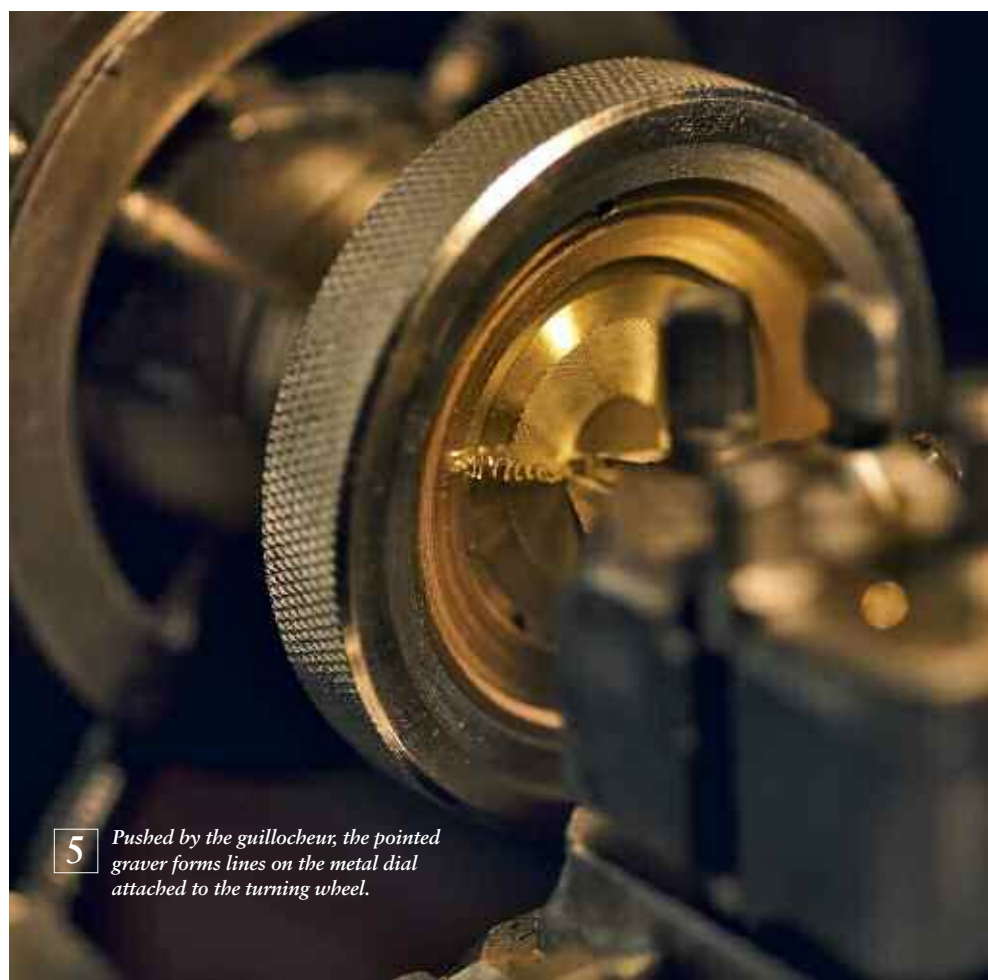
3

The machine was made 113 years ago by the La Chaux-de-Fonds firm of R. A. Lienhard.

The rose engine, that Jules Verne-like contraption on the preceding pages, is an endangered species. Only a few of them still exist, and more are not on the way: production ceased in the 1940s. But those that remain, nestled in a few privileged watch ateliers, continue to produce, as they have for 300 years, the intricate engraving on watch cases and dials known as guilloché, or engine turning.

Guilloché is a form of engraving that decorates objects with engraved lines to form geometric patterns. It gets its name from a French engineer named Guillot who is reputed to have invented the machine. It is also referred to as an engine-turning machine.

The rose engine shown in these pictures was produced in La Chaux-de-Fonds, Switzerland in 1897, and is still in



5

Pushed by the guillocheur, the pointed graver forms lines on the metal dial attached to the turning wheel.



use in Switzerland. This is the machine that created the elaborate guilloché work on the Slim Classique collection introduced by the new Ralph Lauren Watch and Jewelry Co. last year. Lauren, a fan of guilloché decoration, selected a distinctive spiral barleycorn pattern for the dials and cases of his Slim Classique watches. The pattern has 80 waves woven in a series of compact spirals from the outer to the inner portion of the dial. The central intersections are so fine that they are invisible to the naked eye.

People who can operate them are as rare as the machines themselves. That's why most guilloché work is stamped. Stamping, however, flattens the metal, creating a dull surface. It cannot hold a candle to the beauty of genuine, old-fashioned, hand-guided guilloché (*guilloché*



4 Rosettes in a row

6

*Creating the barleycorn
guilloché pattern on the dial*





7 Metal shavings from the engraved dial

guide a la main, as the Swiss refer to it). “Today in Switzerland only four guillocheurs can be found who are still full-time practitioners of their craft,” says Guy Châtillon, CEO of RLWJ in Geneva. Just who does Ralph Lauren’s guilloché work is a trade secret. The company says only that it relies on Richemont Group suppliers that it prefers remain nameless. (RLWJ is a subsidiary of the Richemont Group.)

So enamored is Ralph Lauren (the man and the company) with guilloché that the company assigned a photographer to try to capture the Old World essence of the engine-turning machine. Some of the photos are shown here. They offer a rare glimpse into the intricacies of the art of guillochage that transforms a blank piece of metal into a work of art. They also cast a rare spotlight on the treasured antique instrument that makes it.

The photo on the opening spread shows the rose engine as the guillocheur sees it just before taking his position on the stool. The piece to be engraved is placed in the round holder in the center of the machine, just below the binocular microscope. To the left of the stool is a hand-cranked, belt-driven spindle, which the guillocheur turns with the left hand (hence the name engine-turning). With the right hand, he operates a carriage with a graver, the cutting tool that engraves the metal with lines measuring



8 The finished barleycorn guilloché pattern on a Ralph Lauren Slim Classique dial



9 *Guilloché dials and bezels on Ralph Lauren's new 38-mm Slim Classique watch (right) with the 42-mm version introduced last year*

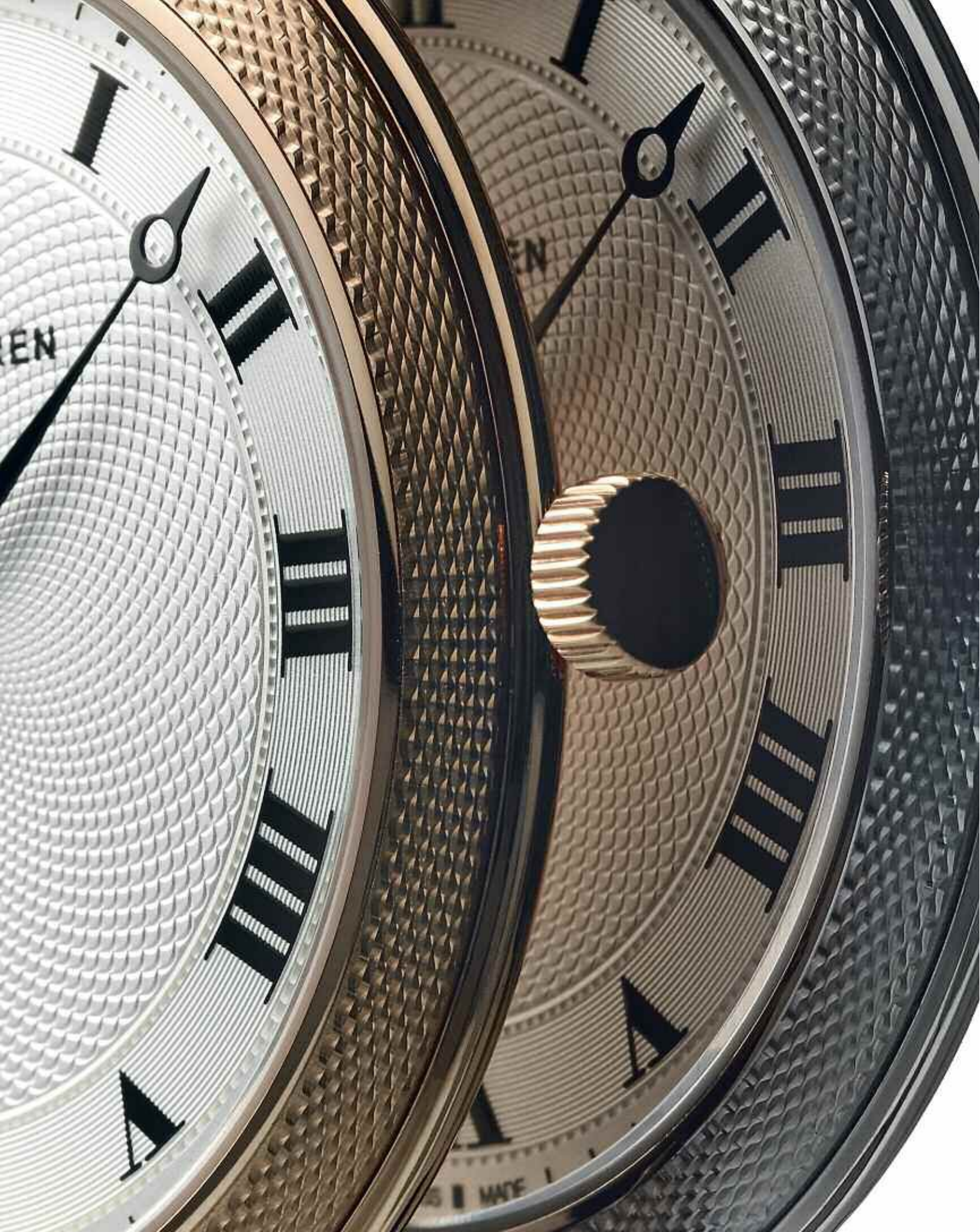
three or four hundredths of a millimeter, thinner than a hair. The graver carriage and tool remain in a fixed position. The guilloché is formed by the guillocheur gently nudging the graver into the metal object (in this case a dial) in the revolving holder. The engraved lines are formed as the holder revolves, via a system of wheels and pulleys, powered by the guillocheur turning the handle of the crank. The spindle revolves in a back-and-forth rocking motion as it follows a pattern determined by round guide templates, called rosettes, positioned in the rose barrel behind the holder (hence the name "rose engine"). The art of guilloché involves mastering the proper balance between the rotation speed determined by the guillocheur's left hand and the pressure exerted on the graver by his right.

"Engine turning is both time-consuming and unforgiving," says Châtillon. "The speed of rotation and amount of pressure are both manually controlled. An absolutely steady hand and total concentration are essential to ensure regularity of the pattern and correct depth of the engraving. A lapse in attention may produce visible flaws, causing the work to be rejected." You see the consequences in photo 2, a closeup of the work table on the far right of the machine, sprinkled with dials the guillocheur has rejected.

Photo 4 shows the rosettes lined up in the rose barrel. The guillocheur selects a different rosette for each pattern he wants to engrave. Photos 5 and 6 show the graver etching the barleycorn pattern in the dial on the turning wheel. A tray collects the shavings, which, in the case of precious metals like gold and platinum, will be recycled (photo 7).

Photo 8 shows the intricate barleycorn pattern on the finished dial still in the holder. Photo 9 shows the guilloché dials and bezels on two Ralph Lauren Slim Classique white gold men's watches. On the left is the Slim Classique 42 MM, introduced last year (\$16,500). On the right is the new Slim Classique 38 MM, which the firm is unveiling at this year's SIHH salon in Geneva in January (price to be announced). ○

— Joe Thompson





Gerber's *Babies*

*With an array of innovations for his own brand and others, independent watchmaker **Paul Gerber** has become a force in modern horology.*

BY LUCIEN F. TRUEB

Although Geneva and the Jura Mountains are the hubs of Switzerland's watch industry, one of its most notable watchmakers lives and works in a suburb of Zurich, in a workshop on the ground floor of a single-family home. Paul Gerber was born in 1950 in Bern, where he studied watchmaking with his father, the owner of a watch-and-jewelry shop. As an apprentice, he broadened his horizons by attending courses at the trade school in Zurich, which would become his adopted hometown. It was in Zurich that he met the woman whom he would marry, and it was there that he began his watchmaking career. When an opportunity arose to take over a watch shop in the Albisrieden neighborhood from its former owner, who was preparing to retire, Gerber did not hesitate, approaching his parents for the loan that would allow him to buy it.

However, Gerber swiftly grew bored with the day-to-day affairs of the business: mundane tasks like changing batteries in quartz watches proved insufficiently challenging for him. As a sideline, he began

restoring antique watches and clocks, soon earning such a fine reputation that he received commissions from museums and auction houses. In his watch shop, Gerber had an ample stock of old watch movements and components that his predecessor had left behind. Gerber had always enjoyed working in small dimensions, so he embarked on his other hobby of constructing miniature wall clocks. The first of these was scarcely larger than a matchbox. It was so beautiful that his friends and acquaintances inundated him with requests for similar little clocks. Gerber ultimately crafted a 10-piece series of these.

GERBER HAS always been interested primarily in watch movements: he regards the cases, with their protective function, as little more than necessary evils. Though he is well aware of the importance of design, he doesn't want to be one of those watchmakers who focus on cases and dials while relying on outside movements to power their timepieces.

Experimenting with boxwood, an extremely hard material, Gerber built a tiny wall clock with wooden gears. Only afterward did he learn that he had made the world's smallest such clock, with a move-

In the Guinness Book of Records: the movement of the Cow's Tail Eye-Rolling Watch is a mere 22 mm thick.

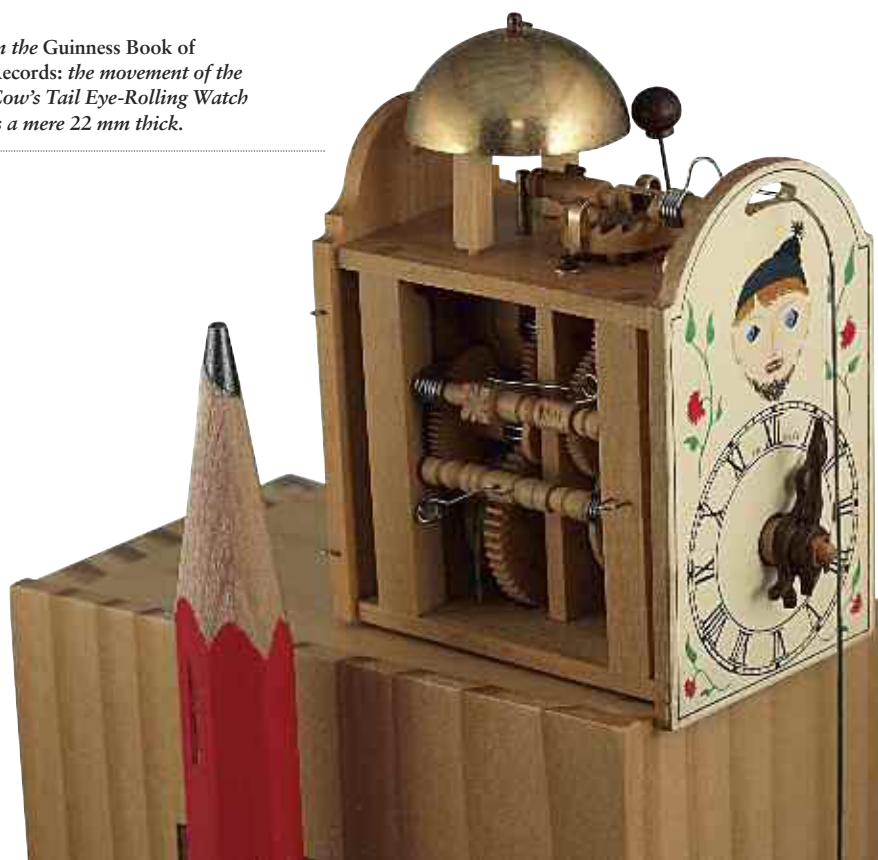


Gerber built several wooden timepieces, including this single-handed one, in the late 1980s and 1990s.

ment measuring a mere 22 mm in height. His ticking creation was duly included in the *Guinness Book of Records* in 1989. This clock is a miniature version of a Black Forest wall clock of the “cow’s tail, eye-rolling” type with striking mechanism. A face is painted above the dial, and the eyes in the face shift tirelessly back and forth in one-minute intervals.

Gerber also used wood as the material for a nearly 75-mm-thick, one-handed *verge fusée* watch with only three wheels. He then collaborated with the goldsmith Gerd Dorschfeld in Italy to create an exclusive *pendule mystérieuse*. Its glass disks, which bear painted hands, are powered from their peripheries, so Gerber had to build an especially powerful movement. He also made a miniaturized English mantelpiece clock for a collector’s dollhouse. For this timepiece, Gerber rebuilt a wristwatch’s movement so that it would support an antique rearward winding and hand-setting system with a tiny key.

GERBER WAS among the first watchmakers to join the Académie Horlogère des Créateurs Indépendants (AHCI), which was founded by Svend Andersen and Vincent Calabrese in 1984. Encouraged by his colleagues, he soon became convinced that he could successfully ply his trade as an independent designer and maker of exclusive timepieces. He sold the watch shop in 1993 and has worked in his own home ever since, just as the traditional watchmakers in Switzerland’s Jura region had done since the early 18th century. Gerber discovered his genuine calling in 1995, when he was commissioned to install a tourbillon in a very complicated movement with grande and petite sonnerie and minute repeater that Louis Elysée Piguet had originally built for a lady’s pendant watch in 1892. Franck Muller in Geneva purchased the timepiece in 1992 and augmented it with a perpetual calendar, an equation-of-time display, a leap-year indicator, a moon-phase display, a 24-hour hand and a bimetallic thermometer. After perfecting the Piguet movement, Muller placed it inside a classically simple platinum case. Upon completion, it was the world’s most complicated wristwatch, but in 1994 it



lost that distinction to Gérald Genta's Grande Sonnerie. But Lord Arran, the eccentric British writer and political figure who had purchased the Piguet-Muller watch, still wasn't satisfied: he wanted to add a tourbillon to the existing complications. One of his conditions for the rebuilding was the retention of the original balance — a slit bimetallic type that provides temperature compensation for the blued steel balance spring. Another was that the watch not become thicker due to the insertion of the tourbillon mechanism. Finally, Lord Arran wanted a flying tourbillon — a cantilevered tourbillon borne only on one end of its axis.

Gerber complied with each stipulation, but the watch was still not a true grand complication because it didn't include a chronograph mechanism. He soon rectified that oversight, adding a rattrapante chronograph function, as well as a center-mounted seconds hand and a jumping minute counter. Though these additional functions added another level to the movement, they were integrated as far as possible into the existing one, thus preserving Piguet's original design philosophy. Power-reserve displays for the going train and the strike train further complicated the multifunctional marvel. The project consumed a total of 11 years and wasn't completed until 2003. Afterward, Gerber also developed a flying tourbillon for Germany's Glashütte Original.

EVENTUALLY, Gerber made his first wristwatches under his own name — beautiful pieces with retrograde seconds hands, a concept that Gerber was among the first to use in an actual working watch. Many other watch manufacturers have used retrograde hands since then, for every conceivable type of display. As a seconds hand, it looks odd because it moves much more slowly than one on a conventional watch: rather than completing one full 360-degree arc each minute, Gerber's indicator sweeps through only 120 degrees each minute. When it reaches the 60th second, the hand returns to zero without a significant loss of time. The module that controls the retrograde seconds hand is a mere 0.4 millimeters

GERBER BEGAN
RESTORING
ANTIQUE WATCHES
AND DOMESTIC
CLOCKS AS A HOBBY.
HE SOON RECEIVED
COMMISSIONS FROM
MUSEUMS AND
AUCTION HOUSES.

The "bright side" of the sculptural moon in Gerber's Model 33 is studded with diamonds.

thick and is installed atop a Peseux 7001 caliber. It also includes a ring around the base movement. Both the module and the base are adorned with Geneva waves and are plated with gold and rhodium. More recently, Gerber patented an automatic version of this caliber with twin rotors, which is now used by Perrelet, most recently in its new Turbine watches.

Gerber has announced, but not yet introduced, a 7.6-mm-thick *manufacture* movement with a big date display and a special seconds hand: the wearer can switch between *seconde morte* (where the seconds-hand advances in single-second increments as on a quartz watch) and the nearly continuous motion that characterizes the seconds hand of a standard mechanical watch. The self-winding mechanism uses three synchronously running rotors made of gold or platinum, all of which are designed to rotate in the same plane without interfering with one another. Twin barrels amass enough power to keep the watch running for 100 hours. Gerber plans to use this caliber as a base movement, gradually adding complications over time.



Also remarkable is Gerber's five-mm-tall, hand-wound, shaped movement, Caliber 33 (34 mm x 28 mm) for the tonneau-shaped Model 33 watch. Among Model 33's most distinctive features is a moon-phase indicator at 11 o'clock featuring a spherical moon made of lapis lazuli; its "bright" hemisphere is diamond pavé with 52 brilliant-cut diamonds. (By special request, Gerber can also make a version with engraved craters.) This construction isn't possible with a movement from any external source, because no manufacturer makes one that could be pierced with the six-mm-diameter hole needed to accommodate Gerber's moon. There's also a version without the moon-phase; the seconds subdial on both versions is located between 7 and 8 o'clock. Gerber inserted into this caliber his own escapement with three ruby pallets on the anchor and two concentric wreaths of teeth on the escape wheel. The escapement is conceived according to a principle put forth by George Daniels, inventor of Omega's co-axial escapement—that only adjacent gliding forces are active. Although this minimizes wear and tear, the system still needs occasional doses of lubrication. The two pallet jewels are made of ruby; the third, central jewel provides the impulse. Almost all parts of the movement and the accoutrements, including the milled guilloché dial and blued hands, are made in Gerber's atelier. The components for the escapement are also made there. Only the escape wheel comes from an external source, the Mimotec firm in Sion. Gerber makes the wheels from hard, milled rose gold. The ruby jewels are set in golden chatons.

GERBER ESPECIALLY enjoyed making entire movements and moving parts for the famous Fabergé eggs. The first Fabergé eggs had been created for the Russian czar Alexander III, but production ceased after 1917 and didn't resume until the late 1990s. Yearly editions have been released since then, and the regulating devices are made in Gerber's workshop. Gerber also builds for Fabergé five different music-playing objects, with moving figures but without clockworks, using very large and powerful springs.



Gerber added a tourbillon and a chronograph mechanism to the legendary Lord Arran watch, making it a true grand complication.

**GERBER MAKES
NEARLY ALL THE
MOVEMENT COMPO-
NENTS AND THEIR
ACCOUTREMENTS —
EVEN THE MILLED
GUILLOCHE DIAL
AND THE BLUED
HANDS — IN HIS
OWN ATELIER.**

The series consists of 10 pieces, each using the smallest music box currently available. In 2000, Gerber again built for Fabergé two different egg-shaped timepieces. The more complicated of the two features jumping hours and minutes, constellations, a moon and music. The movement is ensconced in the upper part of the egg; the winding occurs in the lower half, which also provides a home for a rebuilt music box from the renowned manufacturer Reuge in Switzerland. The case—that is, the egg—was made in Pforzheim by Fabergé's licensee Victor Mayer, who also makes Fabergé jewelry.

The unconventional displays, which are turned upside down, caused some headaches for Gerber. In an ordinary watch, the slowest element (often the date disk) is placed on the lowest plane, with the progressively speedier ones proceeding upward, from hours to minutes to seconds. But this sequence is inverted in Fabergé's musical timepiece: the hours and minutes are lowest, followed by the very slowly rotating year-hoop, the stationary indicator for the sky and, finally, the rotating moon.

Beginning with an eight-day movement measuring 65 mm in diameter, Gerber developed a version with a flying tourbillon. This product, which debuted in Basel in 1999, was intended to fill a niche market in the genre of miniature table clocks. Among its most faithful customers is a Russian firm that makes luxury clocks; this company needed a skeletonized version of the construction with two barrels and an eight-day power reserve.

EVERYONE IS familiar with the stylish Movado Museum Watch designed by Nathan George Horwitt in 1947, with a single dot on an otherwise empty black dial. But the museum watch on which Paul Gerber collaborated isn't merely displayed in a museum; it's the product of a museum — namely, the Musée International d'Horlogerie (MIH) in La Chaux-de-Fonds. The museum's director, Ludwig Oechslin; industrial designer Christian Gafner; and Gerber, who served as design engineer, collaborated to create the timepiece, which was crafted in Gerber's atelier.

Oechslin had dreamed for many years of a perpetual calendar watch that could display the day of the week, month and date in a single window. Oechslin knows that numbers and letters are most legible when their height is equal to one-quarter of the dial's diameter. But not only are the aesthetics out of balance in this type of display; it's also impractical to produce it by mechanical means. A ratio of one to 15 was chosen as a compromise. Also, a genuine perpetual calendar would have been much too costly. Oechslin opted instead for an annual calendar that requires manual resetting only once each year (at the end of February) and can be built from just nine parts. The display uses the simplest conceivable solution: three concentrically arranged disks powered by a series of six additional parts. As a special added feature, this watch also offers an AM/PM display that alternately presents one or two red dots in a little window.

Gerber decided to use ETA's Valjoux 7750 automatic chronograph movement, primarily because it is so robust and powerful, but he significantly reduced its chronograph function, leaving only one push-piece at 2 o'clock to start the chrono-



Gerber developed an escapement in which there are only gliding forces, reducing wear due to friction.

Ludwig Oechslin conceived the MIH Watch; Gerber designed and built it.





Gerber was one of the first watchmakers to use retrograde displays on wristwatches (left). He also developed and patented the double rotor (below).



graph's large elapsed-seconds hand, stop it, and return it to its zero position. A window in the back of the watch offers a view of the 30-minute counter, which uses a rotating subdial and a motionless hand. The uncommonly sleek, simple case and the minimalist matte-black dial with white hour indices and finely calibrated minutes are the work of Gafner. Incidentally, this was the first watch that Gafner ever designed.

Gerber's Settimana model is also based on an idea contributed by Oechslin. Seven holes are drilled in a blued dial. A black dot advances to appear in the next hole each day, thus indicating the day of the week. The case is made of titanium, and a self-winding ETA 2824 caliber was chosen to animate the watch. The graphic calendar needs only the special dial and three additional parts: a switching finger, a wheel and a disk.

GERBER IS SO well known nowadays that he's in a position to accept only those commissions that he really enjoys. One such labor of love was the alarm module for the Valjoux 7750 in Fortis's Cosmonaut Chronograph. This caliber also served as the basis for another project:

the Porsche Design Indicator Chronograph with titanium case, for which Gerber integrated two purely mechanical digital counters and three barrels. The counters at 3 o'clock can tally intervals of up to nine hours and 59 minutes. The entire watch is 15 mm tall.

The team in Gerber's design-engineering atelier currently consists of Gerber himself, his wife (who takes care of the bookkeeping the administrative tasks), and four young watchmakers. Gerber uses a three-dimensional CAD (computer-aided design) system to design watch movements.

Among the most important items in his workshop are two small, numerically controlled, milling machines and a processing center. All of these devices are accurate to tolerances of several 1,000ths of a millimeter. To provide space for the processing center, Gerber had to modify his garage, which wasn't much of a problem because he had never had any cars in it. When Gerber began making his own calibers, he assigned the number "1" to his first creation. The Fabergé movement was number 12. In 2008, he reached number 45. Connoisseurs of mechanical watches eagerly wait as the numbers get higher. ○



Dean Radbourne shows his Corum Bubble Skeleton, purchased last year for his 30th birthday, and his new Bell & Ross BR 01-92, while holding his five-month-old daughter, Adelaide.



Daddy's girls Alejandra and Mariana Cancino with their father Raul after a day of shopping (from left to right): Alejandra wears a Swatch Lustrous Bliss Skin; Raul, his Rolex Deepsea Sea-Dweller; and Mariana, her Locman Nuovo Carbonio.



Jay and Beth Rosin, on their honeymoon in Venice, visit the Piazza San Marco. He wears a Girard-Perregaux Seahawk; she a Panerai PAM 119.

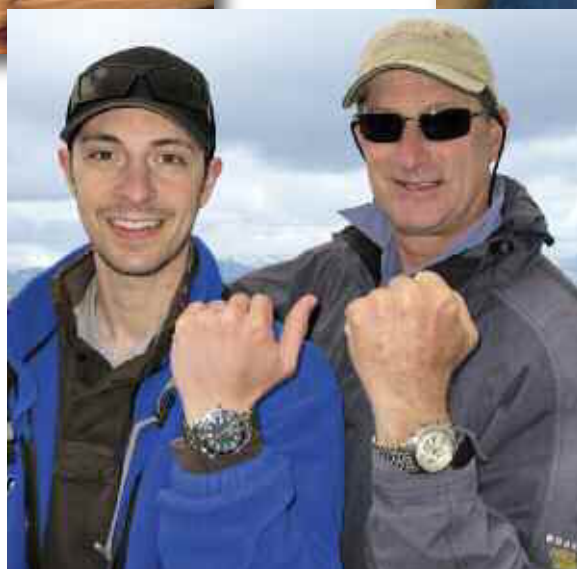


Matthew Hobbs stands outside Blenheim Palace in Oxfordshire, UK, birthplace of Winston Churchill, wearing his Manometro by Giuliano Mazzuoli.



Renee Butorac poses with her Ulysse Nardin Lady Diver while exploring a cave in the Yucatan jungle's underground river system.

Getting ready to perform laser surgery in his dental office, Yao-Lin Tang (left) shows off his Chopard Mille Miglia 2002 LE. His assistant, Frank Loera, wears an Oris XXL Chronograph.



Steven Bricker (left) and his father Jeff at Lake Tahoe during a family vacation wearing, respectively, an Omega Seamaster 300m Chronometer and an IWC Pilot Spitfire Chronograph.

Paul Anderson, in his vintage Tudor Submariner, takes a break from working on the San Francisco-Oakland Bay Bridge on Yerba Buena Island.



Martin Lockström sports his Maurice Lacroix Masterpiece Double Retrograde in the rooftop bar at the Hyatt on the Bund in Shanghai.

To submit a photo, please send your image to photo@watchtime.com with a short description identifying each person in the photo and the watch each one is wearing. Please give the first and last name of the wearer and the brand and model of the watch. If the photo was taken at an event, please specify when and where it was held. Only clear images in which both the face of the watch and the wearer are visible will be considered for publication. Images must be in JPEG format and no smaller than 1 MB. Only the best-quality and most interesting photos will be considered.

Question Time

WatchTime is blessed to have many passionate and curious readers. Due to the volume of mail we receive, it is impossible for me to reply personally to each letter (although every one is read in full). What's more, many of the inquiries we receive tax my limited horological knowledge. The solution? Tap into the mega-wattage of the super-smart WatchTime community. What follows is a sample of queries I can't answer. If you can, please drop me a line at jthompson@watchtime.com, and I'll pass the info along.

• "I am looking for a watch that has both an altimeter to track the amount of feet skied in a day as well as one that has a heart monitor on it. I am aware of brands like Suunto and Polar but was hoping for something a little dressier than those brands, that has more style. I am looking for a watch with more than just a plastic housing and strap." **Bill**

• "I have a problem with two wristwatches that I own. Rolex Vintage Tudor Snowflake Dial & Hands. Circa 1958. Rolex Oyster case. Auto Prince Oysterdate. Submariner case. ETA movement. I show both to many people and all say there is no such thing. I know they are real. I know both divers that I got them from. They are not in the Rolex Tudor books. On checking other places, I found one in Singapore and one in Canada. That makes all of four around the world. I think they are very rare. So rare that people think what I have is not real." **Nancy in Maryland**

• "I am a collector trying to track down an original TAG Heuer catalog for the years 2001 and 2005. I have tried TAG Heuer's service provider here in Australia, plus many stockists, to no avail. I have even tried eBay and Amazon."

Paul in Australia

• "Christian Bale's watch in the movie *Public Enemies* really caught my eye. I was curious to find out the make and model of this particular watch." **Matt**

• "I am a watch repairman in the process of restoring my Bulova Accutron #L260. I bought it in 1977 and have been told that it is a very good watch and that I should hold onto it. My problem is that moisture got under the crystal and got on the face of the watch. I never did anything about it and therefore a film is now visible on it. The face is gold in color; I am not sure what it is made of. It has applied numerals and black print on it. I would like to keep it as original as possible. Is there anything I can use to clean it up?" **Tony in Detroit**

• "I have a very nice collection of high-end watches. I rotate my watches and wear each watch for only a few days at a time. However, unless the automatic watches have a date, moon-phase, or other complication, I see no compelling reason to keep them on a winder. Sometimes when I select a watch and wind it fully before putting it on my wrist, the second hand does not start unless I lightly tap the crystal with my finger or very gently 'knock' the watch against the soft palm of my hand. It then starts and keeps time as it should. Why is this tapping sometimes necessary? Why would the watch not start on its own when fully wound?"

Stuart in Chicago

• "Last night the movie *Company Business* was shown again. In it, Mikhail Baryshnikov wears a watch that was shown clearly near the end of the movie when he was entering the Eiffel Tower. Do you know what watch it was? Or was it special for the movie?" **Frank**

• "I have several analog quartz watches. Most of them are not worn for months at a time. I currently pull out the crown to stop the movement when storing the watches. Will it damage the movement by not running it for long periods?" **John**

• "I hope you can help me. I have a manually wound watch given to me roughly 15 years ago after the passing of my great-grandfather. It still ticks, keeping perfect time! The face says the following: Under the 12 is the word BUTEX, and immediately under that is the word SWISS. Above the 6 o'clock, it says SWISS MADE. In the middle of the caseback it says BUTEX SWISS. There are two lines of numbers under that, 822006 and 2345. In a circular pattern that runs parallel to the edge of the caseback, it says SWISS MADE, STAINLESS STEEL BACK, WATERPROOF, ANTIMAGNETIC and INCABLOC. Even with the help of Google, I cannot find anything about this mysterious company." **Jerry**

• "I am hoping you might be able to provide some recommendations for an over-40-mm, sporty-looking, stainless-steel (cost purposes) world-time function whereby you can see the time zone in any of the 24 different time zones immediately, without setting any dials and without any additional clutter of different functions, like a chronograph, etc."

Suba

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